THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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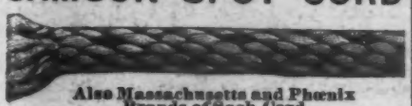

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THE IRON AGE

THURSDAY, JUNE 5, 1902.

Tunneling Under the Busiest Section of New York.

New York is building an underground system of rapid transit railroads. As a consequence certain streets along the line are in a more or less disordered condition and traffic is thereby impeded. But the openings in the surface convey no idea whatever of the extent of the work carried on below. They resemble the entrance to a cave, which may be small and insignificant and yet admit to a grand series of chambers, or it may be of imposing appearance and dimensions and introduce to nothing but a hole in the ground.

For convenience, work on the tunnel may be considered as of three classes: Open cut, embracing the whole width and length of a section; tunneling proper—that is, sinking a shaft and excavating each heading, and a combination method of open cut and tunneling. The first is employed only in the sparsely settled districts uptown or at the northern end of the line, and along those streets downtown which could be closed without causing undue inconvenience. The second has been used in certain all rock sections, and, of course, under the Harlem River. The third method is the one most extensively pursued and is used under the most thronged part of New York, which probably means that tunneling is progressing under the busiest locality on earth.

At this point all those who use the Brooklyn Bridge meet. The bridge entrance faces City Hall Park, connects with the Second and Third avenue elevated railroads and is within a stone's throw of most of the New York daily newspapers. Park row, which passes the entrance, is, therefore, an extremely busy thoroughfare, without taking account of the bridge travel.

The tunnel enters Park row at its junction with Centre street, passes south to Beekman, then curves under City Hall Park, making a loop, which unites with the main line at the Record Building, shown in Fig. 2. The main line will extend south to the Battery, passing between the Post Office and the Syndicate Building, the highest office building in the world. In this particular neighborhood are many other massive structures, which demanded the utmost caution in carrying forward the work so as not to endanger their foundations. For the most part the material is sand and gravel.

Brooklyn Bridge. World.

Fig. 1.—Looking East.

TUNNELING UNDER THE BUSIEST SECTION OF NEW YORK.

Openings are made along the west side of Park row, skirting the Park, from Mail to beyond Chambers street on the north. A small opening is in the triangle formed by the union of Park row and Nassau street, in front of the *Tribune* Building, and at the foot of the statue of Benjamin Franklin, whose head is inclined as if the great printer were seriously considering the usefulness of the whole thing. There is another long and narrow excavation on the west side of the *Staats Zeitung* Building. The entire front of the bridge entrance is undisturbed except on the Park side of the street. The entrance has been extended over the cut to the portico of the Record Building, as shown in Fig. 2, thereby permitting easy access to the Park and thence to Broadway and the West Side car lines.

While the method of working is extremely simple, the

greatest care must be constantly exercised so as not to risk the foundations. At the same time the entire surface of the street, with its tremendous live and dead loads, must be supported. Also the gas and water pipes and electric tubes must be taken care of. After the excavation has been opened along one side a cable way is erected its entire length. In the particular excavation here illustrated in all the views the engine operating the hoist is at the southern end, Fig. 2. The hoist can thus be traveled the entire length, the bucket picked up at any point and its load dumped into the cart. The cart receives its load on a bridge spanning the cut. The actual tunneling progresses laterally beneath the street, the roof being supported by heavy timbers as the work goes forward. As the excavation deepens sheet piling is introduced to support the side walls which adjoin

Brooklyn Bridge entrance. World. Sun. Tribune. Old Hall of Records.

Fig. 2.—Looking South.

TUNNELING UNDER THE BUSIEST SECTION OF NEW YORK.

buildings, the piling being supported by horizontally disposed struts.

Narrow gauge tracks, Fig. 4, extend from the open cut into the excavation and upon these the buckets are run so as to be reached by the hoist. After the digging has been completed the floor, side walls and steel framing for the roof are constructed.

According to the *Aluminum World* the use of aluminum transmission lines has been steadily growing since 1896, when aluminum cables began to be used at Niagara Falls for conducting the current from the power house at the bottom of the cliff to the reduction works at the top. Aluminum lines have been erected in all sections of the country, but particularly on the Pacific slope, where there has been a remarkable utilization of mountain water powers. Interesting reports are published in the May issue of that journal of the satisfactory service rendered by the aluminum lines used by the Bay Counties Power Company and the Standard Electric Company of San Francisco and by the city of Healdsburg, Cal., as well as the Leavenworth Railroad Company, Walcott, Kan., and the Hartford Electric Light Company, Hartford, Conn.

The Niagara Falls Power Tunnel Inspected.

The Niagara Falls Power Company made an official inspection of their tunnel on the morning of Sunday, June 1. Preparatory to this inspection all the tenants and consumers of power from their great central station received notification that there was to be a total shut down of the installation that has commanded the admiration of engineers from all over the world. There was but a partial load carried on Saturday, May 31, and several of the manufacturing establishments on the lands of the company did not operate on that day. The complete stoppage came late Saturday night, and all of the ten great turbines and ten huge dynamos forming the installation of the station stood still.

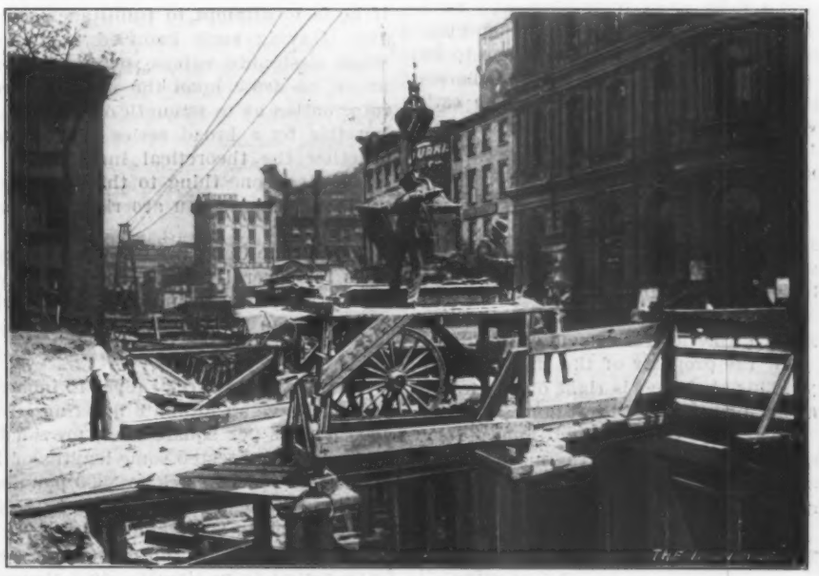
So far as the machinery of this wonderful installation was concerned it was a picture of idleness, but not so with the engineering force of the company. The shut down was developed in order that the bulkhead in the tunnel extension between the old and new wheel pits might be removed and the tunnel extension permanently opened. This was done. The hour for shutting down this station of such extended connections was selected at a time when it would least inconvenience the patrons of the company. Not only did the Niagara Falls industries have to be taken into consideration, but the Tonawandas, Buffalo and Lockport, as well as the electric car service all about the Niagara region.

For this reason it was 1.30 o'clock on the morning of Sunday, June 1, before the stoppage occurred. In Buffalo the trollies were operated by a steam plant and a storage battery service, while the Buffalo General Electric Company got current from the railway company's steam plant. When the gates had been closed and the

turbines and generators brought to a standstill, preparations for inspecting the tunnel were made. Electric current was thrown in from the generators of the Canadian Niagara Power Company, located in the station of the Niagara Falls Park & River Railway, Canada side, and this was used for lighting the old wheel pit. As the pumps of the Niagara Falls Water Works Company, an allied company of the Niagara Falls Power Company, are located in wheel pit No. 1, where they are operated electrically, the reserve steam plant was ready for operation in case of need caused by fire.

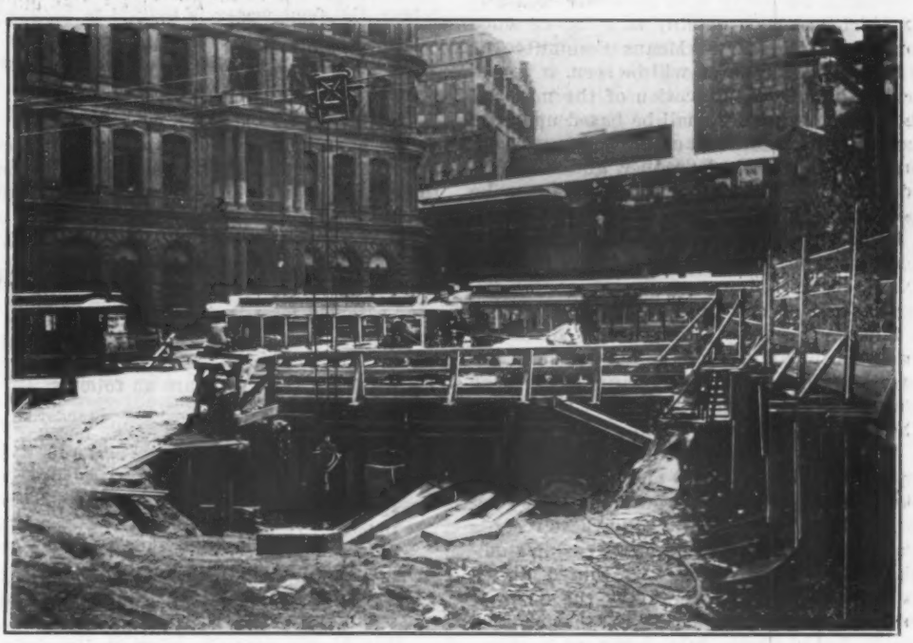
Soon after 1.30 a.m. Vice-President William B. Rankine, Edward D. Adams, both directors of the Niagara Falls Power Company; William A. Brackenridge, resident engineer; Ciemens Herschel, consulting hydraulic engineer, and others went down the old wheel pit and passed through the connecting tunnel into wheel pit No. 2, and thence into the tunnel. The bottom of the tunnel was covered from 1 to 1½ feet deep with running water, the leakage of the gates, but as all in the party were properly clothed for the trip underground this was hardly noticed, except on the return back up the tunnel, when it was found more difficult to walk against the stream than it had been to walk with it.

The total length of the tunnel from the new wheel pit to the portal on the lower river in the gorge is 7436½ feet. From end to end this great hole, over a mile long, 21 feet high and 18 feet 10 inches wide, is lined with brick. Not only is it lined, but at all points there are at least four rings of brick, while in many places the rings number seven and even eight. The eyes of all in the party followed the illumination of the torches to find if at any point the walls showed a breaking away, or even a weakness, but at no point was there the



Staats Zeitung.

Fig. 3.—Looking North.



Staats Zeitung. City Hall Station of Elevated Railroad.

Fig. 4.—View Midway Between Figs. 1 and 3.

TUNNELING UNDER THE BUSIEST SECTION OF NEW YORK

slightest change since the great tunnel was completed. It was in the most perfect condition, and the engineers and directors of the company were delighted.

Considering the years that this tunnel has been in use, the result of the inspection was a grand demonstration of the perfect workmanship of those who built it. It was in 1894 that the first water from turbines was turned into the tunnel. This came from the wheels of the paper mill located on the Power Company's lands. In 1895 the Niagara Falls Power Company started their installation in part, and ever since then the water has been pouring through it in great quantities and at a terrific rate. In 1896 or 1897 the tunnel was inspected, but constantly since then there has been no let up to its service as a tail race. The water from ten 5000 horsepower turbines has been rushing through it, the estimate being that 4600 cubic feet of water passes through every second. At 7 o'clock Sunday morning the water was again directed upon the turbines, and soon a supply of the energy of Niagara was once more available for the use of man.

It may be added that when Mr. Rankine and party reached the portal of the tunnel they found Engineer R. S. Buck and Superintendent Rothery of the International Traction Company already at work upon an inspection of the northern American abutment of the upper steel arch bridge, now the property of the International Traction Company. This abutment is right on the water line of the stream that pours out of the tunnel, and the wash of the waters against it is terrific, but a very thorough inspection proved that it is in the most perfect condition, the form of construction being ample to protect it from all danger.

Another Drawback Ruling on Cast Pipe.

WASHINGTON, D. C., June 3, 1902.—The Treasury Department has issued a series of regulations for the allowance of drawback on the exportation of cast iron pipe which exemplify the general tendency of the Department to liberalize its policy with reference to drawback rulings, which has been notably in evidence since the discussion in the Ways and Means Committee of the Lovering bill. In this case, as will be seen, it is provided specifically that the identification of the material and the method of manufacture shall be based upon the records of the manufacturers, rather than upon the expert examination of the finished product, and it is further provided that these records shall at all times be open for inspection by customs officers. The regulations, which have been issued upon the application of the United States Cast Iron Pipe & Foundry Company of Burlington, N. J., are as follows:

On the exportation of cast iron pipe manufactured in part from imported pig iron paying a duty of $4 per ton, a drawback will be allowed of the duty paid on the imported material entering into said manufacture, less the legal deduction of 1 per cent. The drawback entry must show the number of pounds of pipe exported, and furthermore, in addition to the usual averments, that the exported pipe was manufactured of the material and in the manner set forth in the manufacturers' sworn statement as made from their records, and these records shall at all times be open for inspection by customs officers. Weights shall be provided by a United States weigher. In the liquidation of the entry the basis of drawback which may be allowed may equal that claimed in the application, but shall not exceed 24 pounds of imported pig iron in each 100 pounds of exported pipe.

W. L. C.

It is reported from Germany that the construction of a great tunnel between Germany and Austria is contemplated. The tunnel will perforate the Wetterstein range and will be 18 km. in length. The length of the St. Gothard tunnel is 14 km. and 912 m.; the Mont Cenis is 12 km. and 237 m., and the Arlberg is 10 km. and 240 m. The statement is made that the cost of this tunnel is estimated at 40,000,000 kronen, which will be shared in equal proportions by Austria and Germany. Its construction, however, will be a less costly undertaking than either of the other great tunnels mentioned, notwithstanding its greater length.

Piping Materials for Steam Plants.*

Designing a system of steam piping is properly the province of the professional mechanical engineer. The manufacturer is interested in the design only so far as it may adversely affect his product. He has, however, a vital interest in the quality and type of the materials specified, as in the event of failure of any part of the system he usually bears the lion's share of the blame.

It is obvious that the manufacturer of any article whatever should have a knowledge of service conditions if he is to attempt to fulfill such conditions satisfactorily. Having such knowledge, it becomes necessary, when designing valves, fittings or other steam appliances, to draw upon the usual sources of engineering information as to strength of material, &c., supplementing this by a broad series of shop tests to determine whether the theoretical information is borne out by facts. It is one thing to think you are right and quite another to know you are right because you have demonstrated it.

The Crane Company have carried on a series of such tests for several years, principally covering the field of high pressure steam piping, and as briefly as possible I will give you the results:

Pipe.

Ordinary commercial pipe, 12 inches and smaller, appears to have an ultimate bursting strength in excess of 1500 pounds per square inch, provided the weld is perfect. We have tested some lengths of 10-inch pipe taken at random out of stock to 2300 pounds per square inch, 8-inch to 2000 pounds, 12-inch to 1500 pounds, 16-inch ⅜ inch thick to 800 pounds, 24-inch ⅜ inch thick to 600 pounds, all without rupture or apparent distortion. We have tested from time to time thousands of pieces of all sizes, 20 inches and smaller, under 800 pounds per square inch, so that as far as strength is concerned, there appears to be no reason why pipe heavier than standard should be used on power plant work. In plants where the feed water is bad, it is economy to run the feed lines of extra strong pipe, and this has become quite a common practice even where the water is comparatively good.

Flanged Joints.

We have had occasion to make nearly every possible style of joint, but the major portion of our orders are for either screwed or shrunk flanges, in the proportion of about 85 per cent. screwed to 15 per cent. shrunk. Considering everything—first cost, ease with which a line can be altered or repaired, freedom from troublesome leaks and strength against tensile strain—we think a good screwed joint is superior to any other. We use two lengths of threads, the standard up to 125 pounds and a somewhat longer full taper thread for pressures up to 250 pounds. They compare as follows:

	Standard. Inches.	Extra heavy. Inches.
4-inch length	1 3-16	1¾
6-inch "	1 7-16	2
8-inch "	1⅝	2 1-16
12-inch "	2 1-16	2 9-16
16-inch "	2 7-16	2⅞
20-inch "	2¾	3¼

To determine the holding power of threads we made a large number of test, commencing with the long threads and gradually cutting them away. Results showed that the strength of the joint was limited by the strength of the cast iron flange. In no case was the thread stripped. On a 10-inch pipe the threads were reduced until barely five threads were in contact instead of 14, as called for by our standard tables. On the test the flanges broke at 650 pounds per square inch, all threads being intact. This question of the holding power of threads is one that we frequently have to explain, as some people are under the impression that under high pressure the threads are likely to strip. A calculation of the amount of metal which would have to be sheared off before the joint parted will effectually still any fears in this direction. Taking, for example, our

* Paper read by John B. Berryman, manager engineering department Crane Company, Chicago, before the Engine Builders' Association of the United States, at Pittsburgh, May 22, 1902.

standard length of thread, eight threads per inch, the result works out as follows:

Size.	Length of threads. Inches.	Metal in contact. Square inches.	Sectional area of full weight pipe. Square inches.
8 inches	1⅝	42	8.396
12 inches	2 1-16	77	14.579
16⅝ inches	2 7-16	116	18.41

If we assume that the shearing strength is one-half of the tensile, then it is evident that the holding power of the threads is fully three times greater than the ultimate strength of the pipe. R. T. Crane had a great number of tests made upon runs of 8-inch pipe, using regular wrought iron couplings, for the purpose of demonstrating that long threads were not essential to strength. The final test was made with threads only ¾ inch long, barely six threads being in contact. The pipe was tested to 1000 pounds per square inch, the pressure being held on the line for a day. If one did not stop to consider the subject carefully it would certainly look extremely dangerous to carry 1000 pounds on a line with only half the usual number of threads, but as a matter of fact there were about 20 square inches of metal in the threads, against 8.396 in the pipe, and the joints were strong enough to carry the line to the limit of its bursting strength.

The object in making threaded joints for high pressure work longer than standard is not to gain greater tensile strength, but to reinforce the pipe by a deep hub and by throwing a large number of threads into contact to guard against the flanges being loosened by the continual vibrations of a high pressure line.

Pipe Should Be Screwed Through the Flange.

It is important to have the pipe screwed completely through the flange, first to guard against the vibration, and second to make a bearing for the gasket upon the end of the pipe and close the thread against the oxidizing action of the steam.

It is our practice to screw the flange on with power, until the ends of the pipe project about 1-16 inch. The piece of pipe is then swung in a special lathe and the projecting ends cut off, a light cut being then taken on the face of each flange to insure them being parallel and at right angles to the true longitudinal axis of the pipe. This refacing operation is absolutely essential to a first-class job. Pipe is rarely perfectly straight, and, even if it were, there is the chance of the thread on the pipe, or in the flange, being cut on a slight angle, which in a long run might throw the line out considerably, or in a run with a number of joints the multiplication of a very small error in each one will aggregate a large one. Each pipe should drop into place naturally without undue strain upon the flanges, and this can only be accomplished by the refacing method.

The shrunk joint is made in the following manner: The pipe is rounded up and calipered. The flange is then bored out to a shrinking fit, and, after being brought to a red heat, is slipped over the pipe and the end of the pipe peined over. The flanges are then turned up in a lathe, as before described. It is claimed for this joint that the full thickness of the pipe is carried through to the face, and consequently it will stand more pressure and have a longer life than the screwed joint. The experiments we have made do not bear out this view. It is certain that against tensile strain the screwed joint will hold all the pressure that can be put on it; in fact, with end and blind flanges sufficiently strong a pipe may be burst under pressure without injuring the threads, while against lateral strain, expansion or vibration a screwed joint properly made is, if anything, better. The chief objection to a shrunk joint is its high cost and the fact that a gasket must cover the end of pipe in order to make a tight joint. There are very few joints of this kind, whether they are shrunk on hot or peined on cold, which will not leak if the end of the pipe is exposed.

Cast iron flanges riveted on are very undesirable, as they almost invariably leak through the rivet holes when subjected to the vibration of a steam line in active service.

Facing Flanges.

We are called upon to face flanges in various ways, the principal being straight face smooth, straight face corrugated, male and female, tongue and groove and 1-32 inch raised face inside bolt holes. For pressure of 180 pounds or less, our experiments go to show that a straight concentrically corrugated face will hold a Rainbow or copper gasket without trouble. We have made repeated tests with pressures up to 1000 pounds without blowing out the gasket. There is no manufacturing objection to male and female facing other than increased first cost, and the fact that such goods are not carried in stock and there is always a delay in filling orders, but operating engineers have frequently complained to us about the difficulty they experience in changing gaskets if for any reason it is necessary to break in on the line. It is a severe task to spring a large heavy pressure line apart sufficiently wide to permit of removing the old gasket and putting in a new one.

The tongue and groove joint is similar to the male and female, except that the recess is not carried out to the inner wall of the pipe. The end of the pipe is exposed to the pressure at all times and the joint is undesirable on that account.

Flanges.

There are two recognized standards for cast iron flanges at present in use. It has taken some time to bring about uniformity, but all the large manufacturers have now agreed to adopt the tables. We attach to this paper dimension sheets covering all details.* Table No. 1 is for steam pressures up to 125 pounds. This table was adopted by a joint committee of the Society of Mechanical Engineers, the Master Steam Fitters' Association, and the manufacturers. Table No. 2, for pressures up to 250 pounds, was adopted at a meeting of manufacturers held in New York on June 28, 1901. It is generally referred to as the "Manufacturers' Standard." It would be a great convenience to all manufacturers of piping material and their customers if the Association of Steam Engine Builders would adopt these standards for all piping connections. The diversity in diameters and drilling of flanges on engines, pumps and condensers is the cause of much trouble and delay.

Flanged Fittings.

We manufacture these fittings in three weights, the lightest for very low pressures, such as exhaust or condenser connections; the second for standard pressures up to 125 pounds, and the heaviest for high pressure lines up to 250 pounds per square inch. The thickness of body metal in the three styles is as follows:

	Light. Inch.	Standard. Inches.	Extra heavy. Inches.
6-inch	..	9-16	¾
10-inch	..	¾	15-16
12-inch	½	13-16	1
16-inch	⅝	1	1 3-16
20-inch	11-16	1 1-18	1 5-16
24-inch	¾	1¼	1½
30-inch	⅞	1½	....
36-inch	1	1¾	....

Applying to these fittings the well-known formula for cast iron pipe, $P \frac{2T}{D} \times \frac{S}{5}$ in which P = pressure, T = thickness of metal, D = diameter, S = tensile strength and 5 = factor of safety, it will be seen that we have largely increased the factor of safety to cover possible defects in the meaal, core shifts, or other imperfections. For example, solving the factor of safety $F = \frac{2\ T\ S}{P\ D}$ and in the case of a 16-inch extra heavy fitting to carry 250 pounds working pressure we have 1 3-16 inches of metal with a tensile strength of 20,000 pounds, then $F = \frac{2 \times 1.18 \times 20{,}000}{250 \times 16} = 11.80$. In a 12-inch extra heavy fitting F = 13.33, and in a 24-inch extra heavy fitting F = 10.

An excess of strength is desirable, as the fittings have to stand the strains incident to changes in temperature, vibration and settling of the pipe line. These conditions make it necessary to use rather heavy flanges and of necessity body metal thick enough to carry the flanges without shrinkage strain. We have also demonstrated by a large number of tests that a formula which may

* We have omitted these sheets.

be fairly accurate for cylinders is subject to some modification when applied to tees, elbows and crosses. In fact, the majority of the fittings burst at pressures considerably below that indicated by theory. In all cases, however, we have a safety factor high enough, and the thickness of metal may be considered well adapted to the purpose for which the fittings are used.

Valves.

In valves the call is now for the straightway type. A number of angle valves are still used on boiler or engine leads, but a globe valve on a plant of any magnitude is very exceptional. They are still used freely on small lines and wherever it is necessary to throttle the steam. Beyond this the gate valve has so many advantages that it has practically secured the market. To cover the range of power plant work we have had to build four lines as follows:

1. Low pressure for exhaust and condensing lines.
2. Standard for pressure not exceeding 125 pounds.
3. Medium for pressure not exceeding 150 pounds.
4. Extra heavy for pressure not exceeding 250 pounds.

Upon the low pressure line we have not made very exhaustive tests, further than to ascertain that the valves are tight at 50 pounds per square inch. The other lines have been thoroughly exploited on all except the very largest sizes. Boiling down the results and striking general averages we arrive at the following: Standard valves, 4 to 8 inches, will burst at about 700 pounds; standard valves, 10 to 16 inches, will burst at about 600 pounds. The larger sizes we have not burst, but have tested the 18-inch to 450 pounds and 20 to 30 inch to 300 pounds pressure without injury. The medium valves will withstand a pressure of about 500 pounds in excess of the standard. Extra heavy valves, 4 to 8 inches, burst at 1600 to 1900 pounds; extra heavy valves, 10 to 16 inches, burst at 1200 to 1500 pounds.

The larger sizes have not been destroyed, but the 18-inch has been subjected to 850 pounds and the 20 and 24 inch to 600 pounds without injury. The same thickness of body metal is used in the valves as given for flanged fittings, except that all gate valves have the metal increased at the top of the body to carry any settling strains.

The next point to ascertain was the maximum load which could be applied to the disks without causing a leak. This load was found to be in nearly all cases 80 per cent. of the ultimate strength of the body.

It must be borne in mind that all pressure valves mentioned were of the solid wedge type. It is not possible to obtain equivalent results from parallel seated double disk valves, for the reason that the latter have two comparatively light faces set out by an internal wedging mechanism, and the face exposed to pressure will spring under a load very much less than can be sustained by a solid wedge.

It has been the custom for many years to rib the bodies of high pressure valves. The ribs give a massive appearance, and are desirable on that account from the standpoint of the selling department, but they serve no good purpose mechanically and are a detriment instead of an advantage. The distribution of metal is so uneven that shrinkage strains are set up all along the corners where the ribs join the body, making the metal porous. A ribbed valve will not stand any more pressure than one with a plain body, and the only point which might be argued in favor of the ribs would be that they stiffen the valve against strains due to settling in the line. It is not, however, very logical to guard against a remote possibility by setting up a number of internal strains, especially where a plain bodied valve can be designed which will take care of all strains reasonably to be anticipated. We have concluded to abandon the ribs altogether, and shall hereafter only make valves of that style on special orders.

For high pressure work we always recommend valves having outside screw and yoke, stationary wheel and rising spindle; in fact, for any service this type is preferable, except on the very large sizes where the great hight from top of spindle when open to the bottom of the valve is a serious objection. The advantages over the internal screw valves are as follows:

1. The stem is an indicator showing at all times the position of the disk.
2. The thread on the stem is never in contact with the steam and can be properly lubricated.
3. There is no thread in the wedge.

Bypasses shoud be used on valves 8 inches and larger when high steam pressure is used. The load on the wedge of an 8-inch valve at 180 pounds pressure is 9047 pounds, and on a 16-inch valve 36,190 pounds. It is obvious that under such loading the pressure must be partially equalized on each side of the wedge before the valve can be opened with facility.

Pipe Bends.

Bends are being used very freely. By their use all expansion strain can be taken up and the number of joints materially reduced. In the process of bending the outer circumferential wall of the pipe is stretched, as the inner wall will not compress to any extent without buckling. There is also an appreciable loss of metal through scaling. Unless the bends are of very short radius they are generally made of standard pipe for pressure of 125 pounds or less, full weight pipe up to 175 pounds, and extra heavy pipe for higher pressures. If the bends are used to take up expansion it is well to make them of pipe as light as is consistent with safety. The shape of the bends will determine generally the material which ought to be employed, as in those with large radius the stretching of the metal may be almost disregarded.

In conclusion we strongly advocate the use of staple, catalogued goods wherever possible. Such a variety of fittings and valves may be obtained now from stock that there does not seem to be any necessity for the enormous number of specials which we, in common with other establishments in our line, are daily called upon to make. Many times these specials serve no other purpose than to put into concrete form some whim or fad of the engineer in charge of the installation.

Specials are often the product of theory only. Staples result from theory and experience. A purchaser who buys a staple article from a reputable house has the assurance that such an article has been thoroughly tried out, possibly hundreds or thousands of them, under conditions similar to his own. In addition he can get reasonably prompt shipment and the benefit of a lower price due to special machinery and the elimination of pattern labor.

The Cooper Union.—At the annual commencement exercises of Cooper Union, New York, on May 31, Abram S. Hewitt, secretary of the Board of Trustees, announced several new gifts to the institution and stated that hereafter the entire building would be used for the advancement of knowledge. Mr. Hewitt made a most interesting address on this occasion, in which he stated that the endowment of the institution, which last year was $958,000, had reached a grand total of $2,133,159. The great increase during the year came partly from Andrew Carnegie and partly from the Cooper family. Mr. Carnegie gave $600,000 and the Cooper family an equal amount, while a gift of $250,000 was made to the institution by one whose name has not been made public. Mr. Hewitt took great pleasure in making this announcement, stating that for 43 years he had annually presented the report of the Board of Trustees on such occasions, and had usually been obliged to state that the income of the institution was inadequate, and for the greater part of those 43 years the appeal he made seemed to fall on deaf ears. He had not expected to live to see the great object accomplished of freeing the building from secular uses and turning it over entirely to educational work. Among the first graduates of the Cooper Union who contributed to its funds was J. J. O'Rourke, the well-known civil engineer, who offered $5000. Prizes and diplomas were awarded to a large number of graduates, including students who had taken courses in the night schools in science, in qualitative and quantitative chemical analysis, and in the night school of art.

Alleghany Ore & Iron Company.

Several leading stockholders of the newly formed Alleghany Ore & Iron Company visited that property last week and inspected the mines and furnaces as far as was practicable in one day. The C. & O. Railroad placed a special train at their disposal to economize time. The company were formed to buy what is known as the Wilson Run or Dinniny ore property in Craig County, Va., with which is connected the Iron Gate Furnace. This is claimed to hold the record in the South for large and continuous shipments of brown ore during a period of five years. It is now mining with steam shovels from a vein 55 x 125 feet of solid ore. The output is limited by the washer capacity to 500 or 600 tons per day. This will be doubled, however, as rapidly as new equipment can be put in. The ore is an ideal one for basic pig, running 48 per cent. iron, 0.15 to 0.20 phosphorus, and high in manganese.

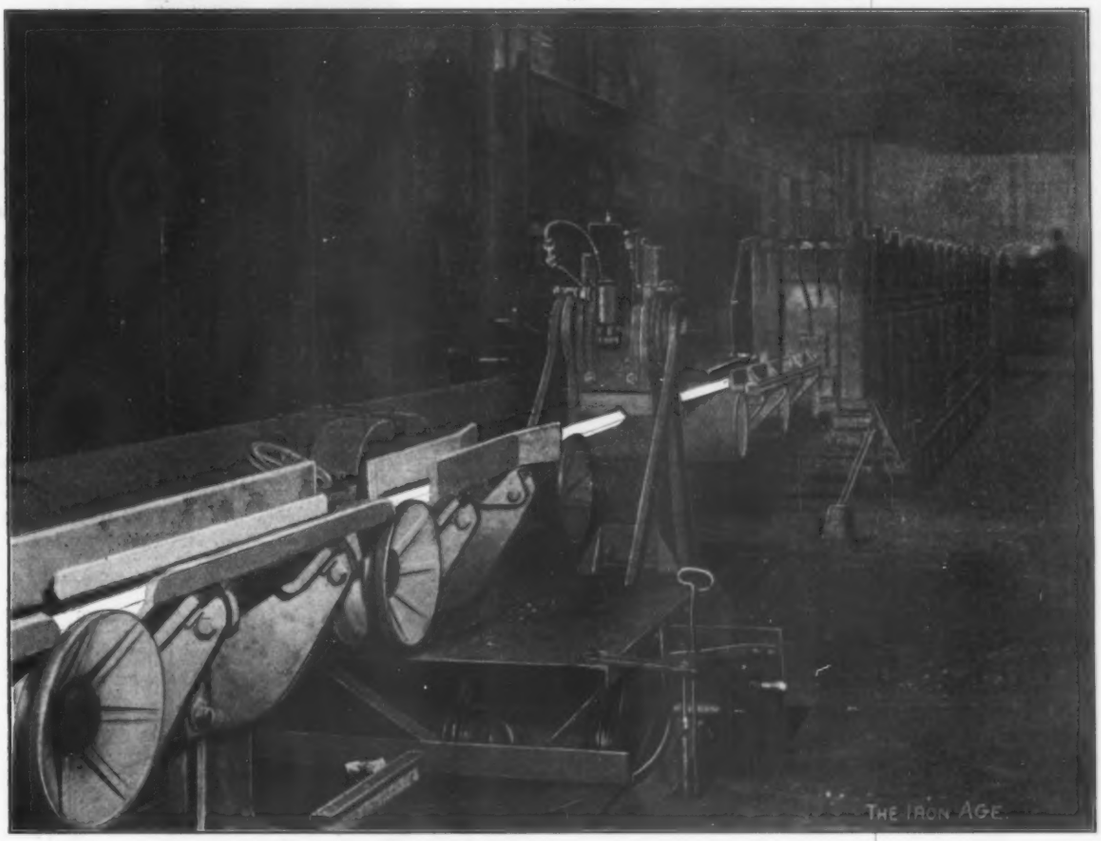
Besides the Iron Gate Furnace the company have bought from the Empire Steel & Iron Company the Victoria Furnace, at Goshen, Va., and the Shenandoah Furnace, at Shenandoah, Va. Both of these properties have had a somewhat checkered existence owing to uncertain ore supply. The output of the Oriskany mine, however, is now sufficient to take care of all three stacks, and will soon provide a supply for the open market. Victoria and Shenandoah have been thoroughly repaired and relined, and both were blown in late in May. The three furnaces have a capacity of 400 tons a day, and are running mainly on basic iron.

The operating office of the company is at Clifton Forge, Va., and the office of the president, C. H. Zehnder, formerly president of the Scranton Locomotive Works and of the Jackson & Woodin Company, is in the Broad-Exchange Building, New York. W. W. Taylor is manager of the company, with headquarters at Clifton Forge.

The Flying Shear.*

BY V. E. EDWARDS, WORCESTER, MASS.

In the engineering office of a past president of this society the question of cutting metal bars while in motion had been so carefully discussed that in 1892 a *carte blanche* order was accepted for a mill and equipment which should accomplish unprecedented results. The problem was to take 2½-ton ingots after they had been worked down on a 34-inch reversing mill to a long bloom having a cross section of 4 x 5 inches, crop the first end of the piece, which was then some 80 feet in length, roll the entire ingot to a section 1½ inches square, cut it up into any desired lengths from 15 to 30 feet, cool the severed billets and load them on cars. The stipulated crop waste was one crop and one short from the 4 x 5 inch bloom. This meant rolling a 1½ inch square section over 600 feet long and cutting it into 20 or more billets 30 feet long, or shorter if desired.



View Showing Flying Shear in Operation.

THE EDWARDS FLYING SHEAR.

The ground available was a triangular space scarcely 100 feet on its longest side. Within this 100 feet must be placed the connecting drawbridge table, the preliminary shear, the mill, the finishing shear and the elevator for taking the severed billets to a high overhead conveyor, which should carry them to a distant elevated cooling bed, from which they would be loaded on cars by gravity. These conditions, of course, called for a continuous mill and meant that the billets must be cut while in motion and close to the finishing pass.

The mill problem was interesting. The shear problem had in addition the exhilaration of pioneer work. The preliminary shear must be able to cut 4 x 5 inches hot steel, and to do this cutting while the bloom was either stationary or in motion. The shear used is clearly shown in Figs. 2 and 6. This is a simple hydraulic shear trunnioned at the base to permit the knives to

* Paper presented at the Boston meeting of the American Society of Mechanical Engineers.

travel with the moving bloom during the instant of cutting.

The shear at the finishing end of the mill required much study. The shear knives must move horizontally as fast as or a little faster than the billet. This horizontal movement must be entirely independent of the billet. The cutting must be done in a small fraction of a second; a clear passage must be made instantly for the oncoming billet; the shear must complete its cycle and be back in its original position ready for the second cut, all in less than one second. The moving parts could not be made light, as the shear was to cut not only 1½ inches square, but any size up to 9 square inches section, and the steel was liable to be high carbon and quite cool.

From many designs that shown in Fig. 3 was chosen. Fig. 4 shows the elementary idea more clearly. The two most noticeable features of this design are, first, the cutting is incidental to the forward movement of the shear; second, one knife is hinged in such a manner as to swing freely out of the way of the oncoming billet as soon as the cut is completed. The cutting stroke is made by a hydraulic cylinder in connection with a steam intensifier.

As the first end of the advancing billet passes between the knives to crop the first end an attendant presses a small lever. This releases the steam pilot valve, which in turn opens the main steam valve. The steam piston rises, forcing the confined water into the shear operating cylinder. The stroke of the cylinder is 24 inches. Of this 24-inch stroke, about 8 inches are used in picking up the clearance and in getting the shear knives to traveling as fast as the billet. About 8-inch stroke is used for the actual cutting, and the remaining 8 inches are used for clearance and for stopping the moving parts. The instant the shear begins to slow the oncoming billet quietly pushes the hinged upper knife out of its path. Automatic link connections reverse the steam valves, and the return stroke is made by means of a small plunger under constant hydraulic pressure. The upper knife swings back to its original position while the return stroke is being made. The

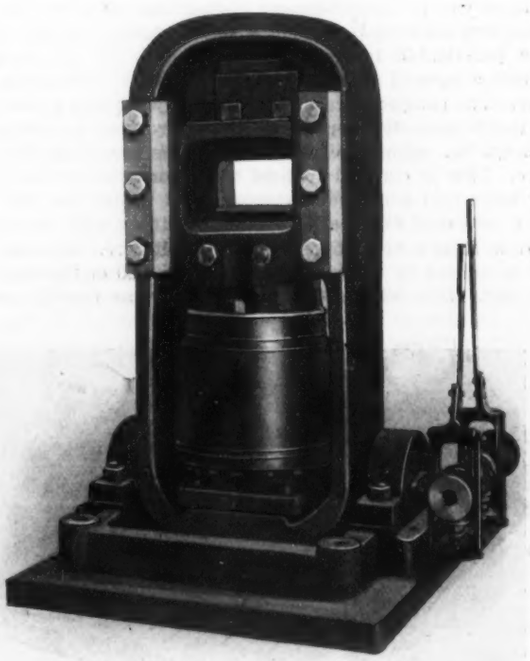


Fig. 2.—Original Preliminary Shear Built for Jones & Laughlins, Limited, in 1893. This is Trunnioned at the Base, Allowing the Knives to Swing through an Arc About 15 Inches Long. The Hydraulic Connection is Made through the Trunnion, as is Clearly Shown. The Return Stroke on this Shear Was Made by Gravity.

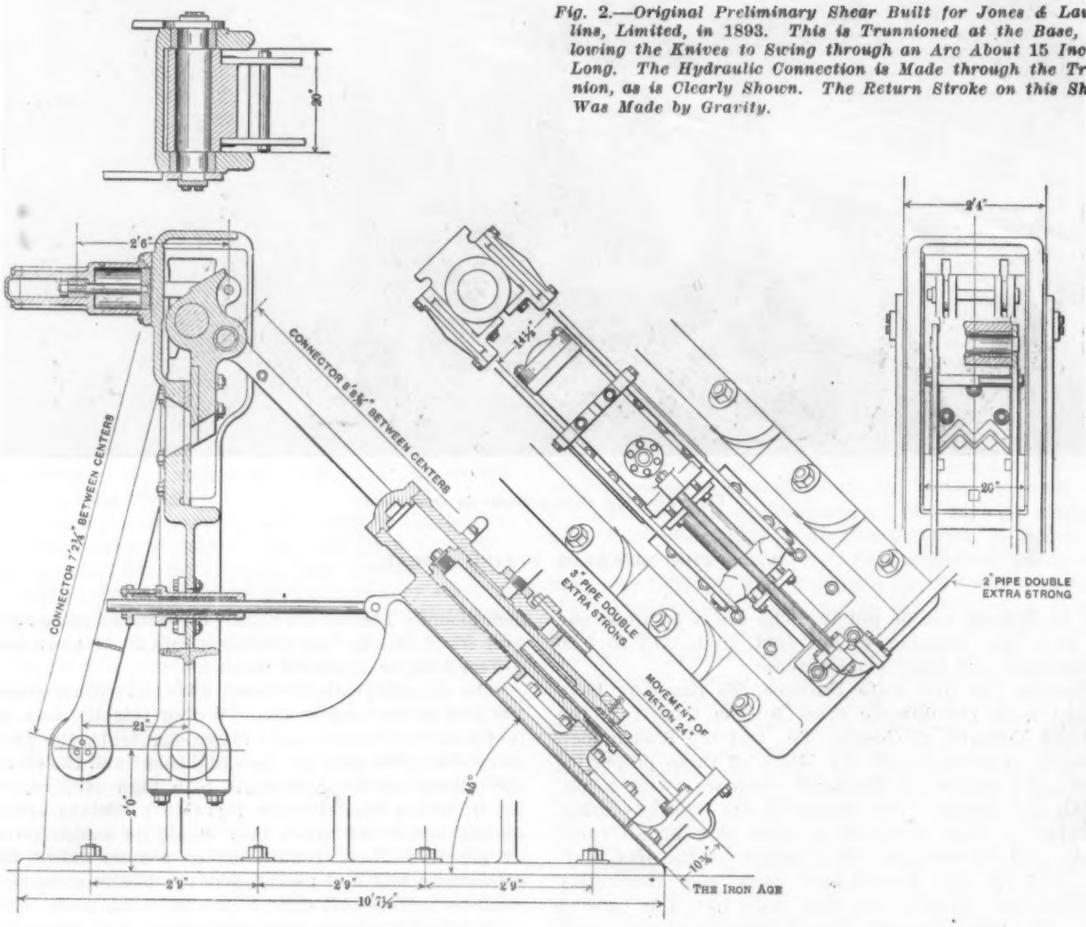


Fig. 3.—Sectional Elevation of Original Flying Shear, Yet in Use by Jones & Laughlins, Limited.

THE EDWARDS FLYING SHEAR.

swinging knife is so heavy that a dash pot is used to prevent slamming.

After cropping the first end all subsequent cuts are made automatically by the advancing end of the billet passing under a trigger placed 30 feet from the shear,

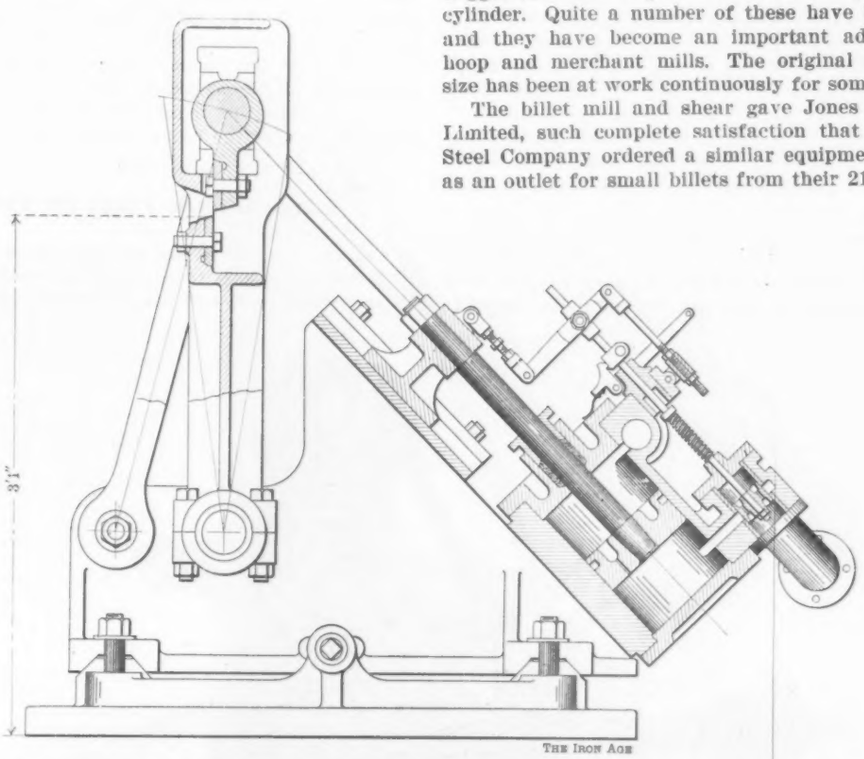
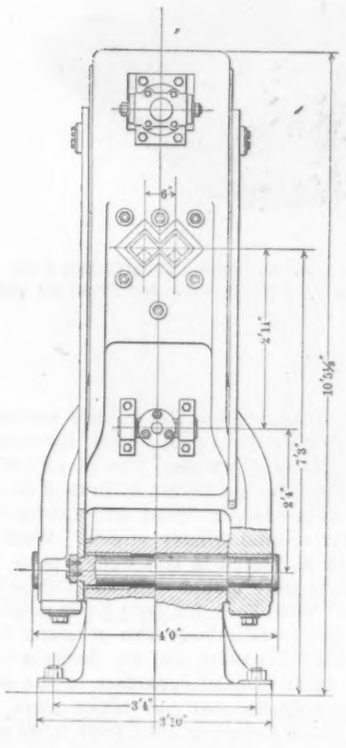


Fig. 4.—Sectional Elevation of Original Small Flying Shear. The Upper Knife is Free to Swing About the Large Cross Head Pin. This Pin has a Combined Horizontal and Vertical Motion, as Indicated by Curved Line.



Portion of Fig. 3.

THE EDWARDS FLYING SHEAR.

or closer if shorter lengths are wanted. The first machine was a complete success and has been in constant use about nine years with only ordinary repairs.

The next shear of this type was a small one for cropping the first end of bars while running between consecutive passes of a continuous mill and for cutting and diverting the bar in case of a cobble. This is shown in Figs. 4 and 5. This is operated by a boy, who snaps the trigger of the small piston valve of the operating steam cylinder. Quite a number of these have been installed and they have become an important adjunct in rod, hoop and merchant mills. The original shear of this size has been at work continuously for some seven years.

The billet mill and shear gave Jones & Laughlins, Limited, such complete satisfaction that the Carnegie Steel Company ordered a similar equipment to be used as an outlet for small billets from their 21-inch mills at Duquesne. To operate this shear a direct connected steam cylinder was used somewhat similar to the small shear which had given such good results, Fig. 6. The success of this installation resulted in the Carnegie Company placing an order for a second mill and shear for finishing the output of their new 40-inch mill at Duquesne. About the same time the National Steel Company ordered a similar equipment for their Ohio plant at Youngstown. More recently the Republic Iron & Steel Company have ordered five shears for their new plant in the same busy city. The shear at the Ohio plant is the fastest running billet shear as yet installed; it is regularly cutting 1½-inch steel billets at a rate of 2000 tons per 24 hours, provided the mill is kept full.

Very high speed work calls for different treatment. In 1894 the Union Iron & Steel Company of Youngstown, Ohio, placed a blanket contract for equipment to roll cotton tie from a billet weighing 225 pounds (the common practice in rolling ties at that time was to use a billet weighing 15 pounds). In this mill everything was without precedent, continuous furnace, continuous roll trains, continuous shearing and continuous cooling. It is needless to say that much trouble was experienced. Perhaps the most serious and expensive annoyance was the discouragement of the workmen by their doubting and pessimistic friends. In this mill it was necessary to cut hot cotton tie ⅞ inch in width by 5-100 inch in thickness, and to do this cutting while the hot tie was traveling at a speed of some 25 feet per second. The cutting in itself did not give much trouble, neither did falling from the roof injure our traditional Irish friend. In both cases the trouble all came in the stopping.

Think of having some 150 hot, limber cotton ties 11 feet 6 inches long, limp almost as wet tissue paper, shot out endwise in one minute with no clearance between the ends. The momentum would slide them over 20 to 40 feet of rough iron floor. Let the least obstruction get in the way and a large pile of scrap was instantly made. These difficulties, however, were soon overcome, and

the arrangements used gave excellent satisfaction for cotton tie.

The shear used is shown in Fig. 7. The knives were carried on two conical drums geared together. In order to get long lengths without having large drums, small drums were used with the upper one carried in a hinged frame. The free end of this frame was supported through connecting rods by eccentrics on a shaft which was driven at one-half, one-third or one-fourth of the number of the revolutions of the drum. By this means the knives did not quite meet, and consequently did not cut the thin tie except on multiple revolutions. By shifting the position of the knives on the cone and by the use of change gears on the eccentric shaft any length desired could be cut accurately.

For barrel hoop it appeared desirable to cool the hoop before allowing the severed strips to overlap, otherwise the hoop would look streaked and not have the beautiful blue finish acquired by uniform cooling with free exposure to the air. It was also desirable to be able to carry stocks in coils from which small orders could be shipped promptly, cut to any specified length. These conditions led to air cooling the hoop by looping it out on an advancing apron and then reeling or coiling the hoop as it was delivered at the far end of the apron after it was sufficiently cool to have acquired and to hold its finish. These tightly wound coils were then either placed in stock or cut up at once on shears entirely apart from any interdependence with the rolling.

The shears shown in Figs. 8 and 9 were quite compact and readily adjustable. The leading feature of these shears is the simple method of getting rotary shears to cut long lengths without complication or large diameters. This was accomplished by making the pitch diameter of the upper and lower cutting heads, together with their gearing, of different diameters. For example: If the gears have the ratio of 4 to 3, it will be seen that the knives would come in opposition but once in three revolutions of the large head, or four revolutions of the small head; this allows the diameters of the cutting heads and gears to be reduced in the same proportion.

Cutting up material while in motion is not broadly new. We are all familiar with many appliances for this work, ranging from the old hay or feed cutter to that imposing organization, the modern newspaper press. Cutting metal bars while in motion had been accomplished, for example, in rolling horseshoes and some other lines. Yet, considering the state of the art at that time, much credit is due Jones & Laughlins for the firm confidence with which they installed an expensive and elaborate continuous mill and accessories while fully realizing that the success or failure of the whole equipment was entirely dependent on something so little demonstrated as the flying shear.

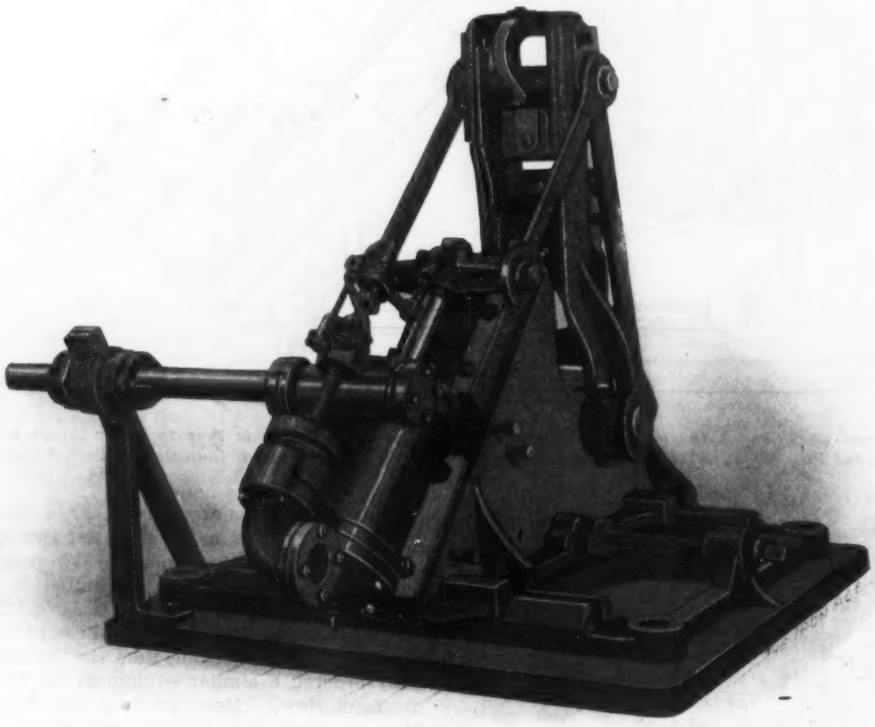


Fig. 5.—Original Small Flying Shear as Installed Between Passes of the First Continuous Cotton Tie Mill and Since Adopted as an Important Adjunct to Continuous Rod Mills for Cropping the First End of Bars Between the Roughing and Finishing Parts of the Mill.

THE EDWARDS FLYING SHEAR.

Large Electric Plant for Chicago.

Chicago is to have one of the largest electric plants in the world. It is to be built by the Commonwealth Electric Company, will cost $6,000,000, and will have a capacity of 100,000 horse-power. Its construction will cover a period of five or six years, involving annually an expenditure of $1,000,000. The plant will be erected on 14 acres of land on the South Branch of the Chicago River, between Morgan street and Center avenue and between Throop and Quarry streets. Work will begin at once, and, as stated in last week's issue of *The Iron Age*, contracts were placed with the Babcock & Wilcox Company of New York for 6000 horse-power of boilers for the initial installation. The necessity for the construction of such a plant and the decision to do it constitute the most marked departure in the electric light and power business that has taken place in Chicago since the Edison Company built their large power house at Harrison street and the river.

It is understood the Commonwealth Company will build their plant so that the current may be used for railroad operation, electric lighting, or power purposes. The alternating current will be developed, as it will be possible to transform it into whatever particular class of current may be required for a given purpose. Whether in laying out the plans for a large station the officials of the company have in mind not only the pro-

duction of current for electric lighting and power, but also for the operation of some of the street railways, and possibly some of the elevated roads, is not disclosed. The fact, however, that the company will be prepared to afford such service indicates the belief of the managers that large demands will be made for electric current within the next few years.

Their plant at Harrison street has a capacity of 24,000 horse-power. They have a plant on the river at Market and Washington streets of between 7500 and 10,000 horse-power, and other small plants of about 2000 horse-power, besides a large storage battery capacity at Adams street of about 7000 horse-power. The total capacity of the Edison Company is about 40,000 horse-

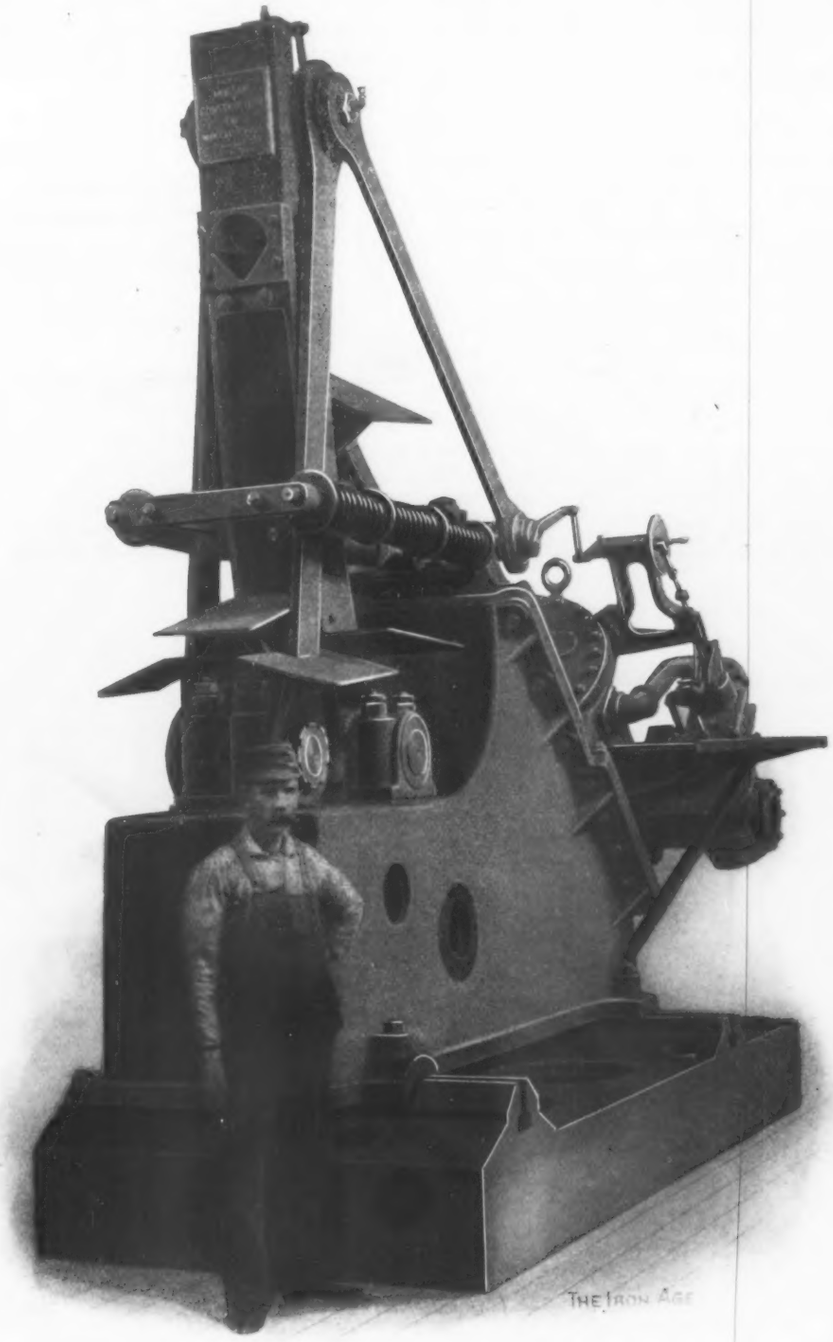


Fig. 6.—First Preliminary and Flying Shears Built for Carnegie Steel Company. On the Preliminary Shear is Seen the Simple Lost Motion Link, by Aid of Which Gravity Returns the Shear to its Upright Position, After Being Tilted Over by the Bloom Moving While Being Cut.

THE EDWARDS FLYING SHEAR.

The electric lighting and power business of Chicago is estimated by experts to increase at the rate of 5000 to 6000 horse-power per annum. This rate of increase could be largely augmented if the operating companies were untrammeled as to capacity. From this it is easy to figure that it will take but a few years to develop the Commonwealth Company's plant to its ultimate capacity, even if no other business than lighting and power is engaged in.

The Chicago Edison Company started 15 years ago.

power. The Commonwealth have a capacity of 5000 horse-power.

When the Harrison street plant of the Edison Company was built it was reputed to be the most economical electric plant in the United States. It is understood that the officials of the Commonwealth Company anticipate, in building their new plant, that such further economies will be instituted as will again place Chicago in the front as the most economical producer of power. The Commonwealth Company intend to make

some radical departures in the character of their machinery, installing something entirely different from anything that has been installed by any of the new plants in this country up to date. It is reported in New York that this is to be the installation of steam turbines to be built by the General Electric Company.

Samuel Insull, president of the Edison and Commonwealth companies, is credited with originating the plans for modernizing and enlarging the electric business of Chicago.

The location is regarded as an excellent one, as it is both central and so related to transportation facilities that the company's supplies can be readily brought to the works at a minimum of cost. It will have not only an abundance of railroad tracks connecting with all the large lines, but will have 700 feet of river front for dock purposes.

The management of the Gruson Iron Works gave a dinner last week at Griffin's Inn, Essington, Pa., to the heads of the various departments of the works. The affair was so successful that it has been decided to make it an annual event.

Manufacturers Interested in the Packing House Suit.

BY R. L. ARDREY, CHICAGO.

The suit of the Government against the packing houses promises to be a matter of great interest to manufacturers in all lines of industry, not alone because it involves the rights and liabilities of manufacturers who become parties to agreements for the regulation of trade, but because it is likely to throw considerable light upon other questions that are involved in the general term "Interstate Commerce." The demands upon manufacturers to file their articles of incorporation and pay franchise fees in States where they market their product have often been found very vexatious, because many of the States provide that a "foreign corporation" cannot collect a debt within their borders unless they have previously complied with these regulations. When a manufacturer is sure that he is engaged in interstate commerce he can safely ignore these demands, but there are many cases when the best lawyers are unable to advise whether a manufacturer is engaged in interstate commerce or not.

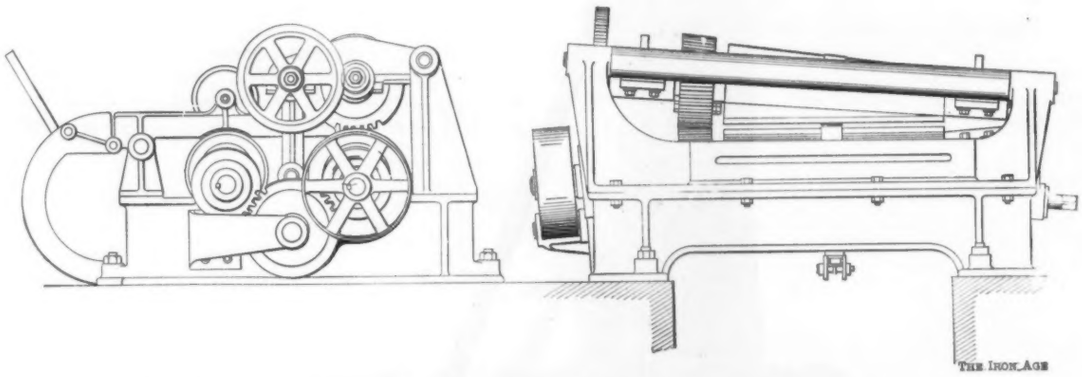


Fig. 7.—Conical Rotary Shear Used for Cutting Hot Cotton Tie Direct from the Finishing Pass. The Central Elevation Clearly Shows the Upper Knife Drum Adjustably Controlled to Cut only on Multiple Revolutions.

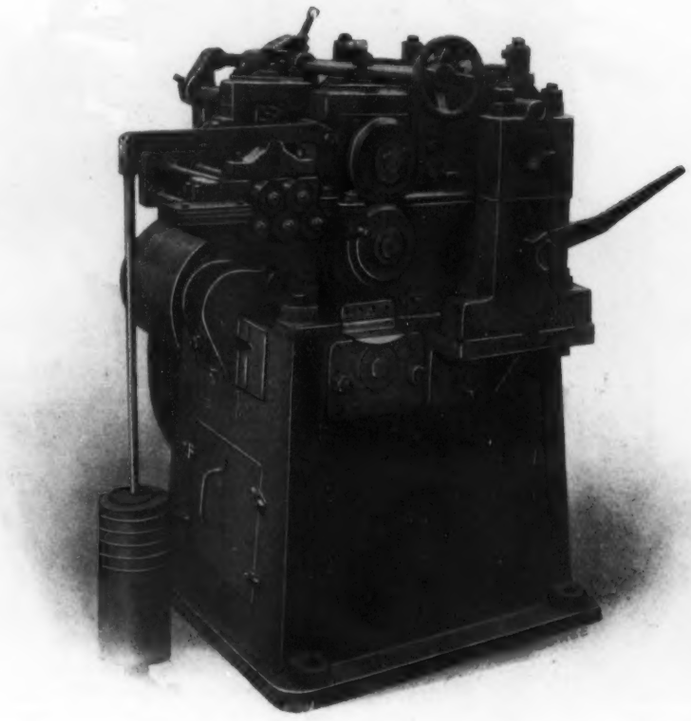


Fig. 8.—Front View of Differential Rotary Flying Shear for Either Hot or Cold High Speed Cutting.

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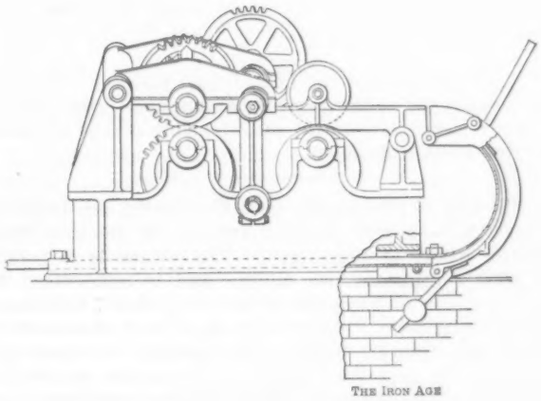
The National Association of Implement Manufacturers, for example, have undertaken for several years past to define for their members the conditions under which they should comply with these foreign corporation laws, and they have agreed to defend in court the interests of any member who, on their advice, disregards these laws. They have taken the position that when a manufacturer does not have an established branch house or carry an unsold stock of goods within a State, merely taking orders by salesmen to be filled by shipment from the factory or from another State, the business is interstate commerce. When, however, a manufacturer does maintain a regular branch house or carry an unsold stock of goods in a foreign State, his company is advised to comply with these laws.



Portion of Fig. 7.

There seems to be considerable doubt, however, as to the dividing lines between interstate and State commerce, and this question is directly involved in the suit against the packers. They do not ship their product direct from the packing house to the consumer or buyer in another State. They have branch houses or depots in these States, to which their product is shipped in bulk and peddled out or delivered on orders to the local dealers. If the position which the implement manufacturers have taken is correct, this business of the packing houses is not interstate commerce, and the packers will not be liable under the Sherman law for any agreements which their agents in the various States may enter into to regulate prices within State lines. On the other hand, if this business is interstate commerce, manufacturers who have heretofore been advised to comply with foreign corporation laws will in most cases find it unnecessary to do so in the future.

There are several other interesting questions involved in this suit, on which a decision is likely to affect all industries. When the case came up in court on May 20, on motion of the Government for a temporary injunction, pending a hearing of the case, the packers objected to only two or three of the points involved on the questions of credits and of reporting to each other delinquent customers and the question of cartage. Judge Grosscup made short work of the demand that the packers be restrained from maintaining a "black list" of delinquent customers, taking the position that such an interchange of information was calculated to promote rather than restrain trade. The bill filed by the Government had, in fact, made a ridiculous demand which, if complied with by the court, would have compelled the packers to go on selling a delinquent regardless of whether he paid his bills and was entitled to credit. On the question of cartage agreements, the Government had asserted that such agreements were in themselves in restraint of trade. The attorneys for the Government in arguing the matter modified their position by claiming that such agreements on the part of the packers were merely a part of their general conspiracy to restrain trade in their products, and should be considered in connection with other agreements, rather than by themselves. They advanced the same argument to show that the alleged agreements of the packers to maintain uniform credits were a part of their general policy in restraint of trade, and should be so considered.

It will be a matter of great interest to business men in all lines to know whether agreements to regulate cartage charges and credits are in violation of the Sherman law. A jobber in Kansas City, Mo., for example,

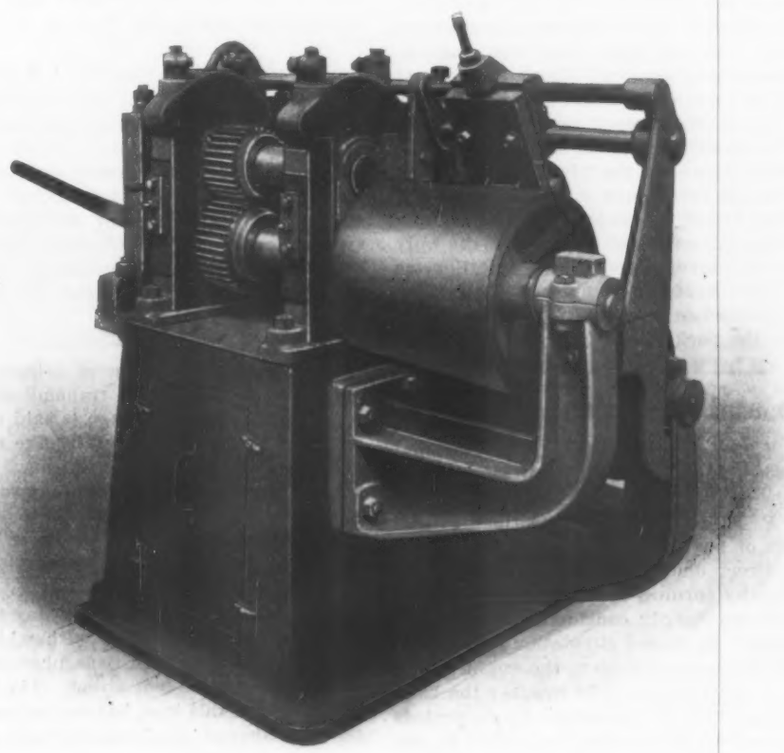


Fig. 9.—Rear View of Differential Rotary Flying Shear.

THE EDWARDS FLYING SHEAR.

is engaged in interstate commerce when he ships goods into Kansas, and a cartage agreement with his competitors would seem to be more in violation of the law than an agreement between branch houses of the packers in Buffalo, N. Y., to charge cartage on business which is carried on entirely within the city of Buffalo. In statements given to the public the packers have claimed that the question of cartage is regulated by a custom of their trade. Such customs are very common in wholesale trade, and it will be interesting to hear the lawyers and the court point out the distinction between a pure custom of the trade in such matters and a condition brought about by a tacit agreement of competing houses.

The main issue in this case is, of course, the alleged agreements on the part of the packers to fix the prices of their products. The court, in drafting the preliminary restraining order, seems to have ignored the charge in the Government's bill that the packers "bait" the market by bidding up the prices of live stock and thus inducing large shipments from the country, and then depressing prices again when large receipts have been stirred up. This charge seems to have been made for publication only, in order to lend interest to the bill, which was given to the Associated Press several days before it was filed in court. Of scarcely less importance than the question of prices is that part of the restrainng order which directs that the packers must not combine or conspire together to obtain rebates or secret rates from the railroads. The packers have always seemed to possess some mysterious power over the railroads to get concessions on their commodities, and if they have had some method of pulling together which this order is designed to prevent, a great many manufacturers who take a deep interest in the transportation problem would like to know how the game has been worked. The railway officials have been very frank in the past six months in telling tales on the packers, and if they prove equally willing as witnesses when the case comes to trial we shall no doubt have some entertaining disclosures. The agitation against the "beef trust" seems to have begun with the statements made by these railway officials to the Interstate Commerce Commission last winter, and the railways are apparently the only interested parties who have gained by the agitation, as they have made considerable advances in their rates recently and are reported to have discontinued the payment of rebates to the packers.

Scientific and Technical Notes.

At the recent Cincinnati meeting of the National Electric Light Association the utilization of the exhaust from power stations for heating buildings was discussed. J. F. Porter and P. H. Korst referred to their experiences with systems of heating by the circulation of hot water instead of direct distribution of exhaust steam. With direct heating by turning exhaust steam into the pipe system there is necessarily considerable back pressure upon the engines. By forced circulation of condensing water through the heating system the engines may be run condensing. In extremely cold weather the back pressure may be advantageously increased during periods of the day when the load on the engines is light to elevate the temperature of the water. This method is particularly applicable to electric lighting stations.

H. T. Edgar reported at the meeting of the Electric Light Association that the El Paso Water Works Station uses oil fuel, which at 70 cents per barrel costs only one-half as much as coal at $5 per ton.

Tests on the comparative cost of oil and coal have also been made at the Houston Electric Company station and the plant of the Houston Water Company. W. W. Reid states that the evaporation at the former was equivalent to 13.48 pounds of water from and at 212 degrees per pound of oil, and at the latter plant the evaporation was 14.71 pounds from and at 212 degrees per pound of oil.

All of the above results agree substantially with the deductions made by Professor Denton at the conclusions of his trials of the West Side Hygeia Ice Company plant in New York, as given in *The Iron Age* in 1902.

The new power station of the Glasgow Corporation Tramways is equipped with electric motors for driving all auxiliaries. The plant contains four 5000 horse-power main engine units and 16 Babcock & Wilcox boilers. The boilers have chain grate automatic stokers, which are operated by four electric motors placed under the floor. The other auxiliaries, surface condensers with air and circulating pumps, the feed pumps, &c., are grouped in a separate room, and all of this machinery is motor driven. Electric cranes cover both the main engine room and the auxiliary room.

It is reported that the Long Island Railway will soon operate its lines between Brooklyn and Long Island City by electricity, as the only feasible means of abating the smoke nuisance.

The firm of Brown, Boveri & Co., Baden, are building a 5000 horse-power turbo-alternator for the municipal electric works of Frankfort. This turbine is to rotate at 1000 revolutions per minute and is guaranteed to have a steam consumption of not more than 7 kilograms per kilowatt hour. This is equivalent to 15.43 pounds of steam per kilowatt hour, or 11.7 pounds per hour per electrical horse-power. Such a performance would correspond to less than 9.5 pounds of steam per indicated horse-power of an ordinary piston engine. The steam pressure is to be 13 kilograms per square centimeter (185 pounds per square inch), and the steam is to be superheated nearly 200 degrees F.

The issue of the *Electrical Review* for May 24 describes the Buckingham page printing telegraph, which prints the transmitted message ready for delivery on a regulation telegraph form or other sheet. It differs radically from those instruments which print upon a narrow strip, like the stock ticker. It is claimed that this system can transmit 200 messages per hour between New York and Chicago (100 in each direction), as compared with 60 messages transmitted over the same circuit by the present Morse code and duplex system.

Another rapid system of telegraphy, originating in Budapest, is reported to transmit messages in ordinary handwriting. The message is said to be transmitted by a strip which is perforated by five rows of dots, dashes and rings to represent the writing. The receiving appliance is described as containing two telephone receivers with concave mirrors attached to the diaphrams. The vibratons of the mirrors throw a beam of light on a sensitized paper and the message is thus photographed.

The Providence *Journal* for May 8 gave an account of a special wide angle lens with which the Union Trust Building, 161 feet high, was photographed from a window across the 60-foot street. The illumination is very unequal with this lens, but correction is made by a rotating star shaped diaphram in front of the lens.

A communication to *Science* by Superintendent O. H. Tittmann of the Coast and Geodetic Survey refers to a magnetic disturbance which was noted at the United States magnetic observatories in Maryland and Kansas on the evening of May 8. The disturbance occurred at practically the same instant at these two widely separated points, and the phenomenon appears to have been very nearly coincident with the eruption of Mont Pelée. The following is quoted from Mr. Tittmann: "Purely mechanical vibrations caused by earthquakes are often recorded by delicately suspended magnetic needles. The disturbance of May 8, however, was distinctly a magnetic and not a seismic one and hence was not recorded on seismographs. Until further information has been received from other observatories it cannot be determined definitely whether this magnetic disturbance was due to some cosmic cause or came within the earth's

crust and was associated with the Martinique eruption. The coincidence of time is, however, a remarkable fact."

The report on the metric system by the Committee on Coinage, Weights and Measures states that there are 64 different ratios used in our present systems of measurements, of which 19 are not divisible by two, and that 18 of the terms used have two or more distinct meanings. It is stated in this report, as a matter of historic interest, that James Watt was one of the first to propose a decimal system. "Estimates made by the Department of Education and others show that the work of at least two-thirds of a year in the life of every child would be saved by the adoption of the metric arithmetic."

Worcester Industrial News.

WORCESTER, MASS., June 2, 1902.—Manufacturers are deeply concerned over the scarcity of coal. Little hard coal is used for manufacturing purposes in Worcester, so that the strike in the anthracite regions does not worry the manufacturers, but the supply of bituminous coal in Worcester is getting unpleasantly low, and the arrival of shipments is exceedingly slow. While there is no immediate prospect of a famine, the manufacturers are striving their best to increase the size of their coal piles.

The Morgan Motor Company are planning to establish a department for the manufacture of trucks equipped with combustion engines of the gasoline type at their new shops at Barber's Crossing. The company are now building steam trucks which have shown great success in their trials. One of the 3-ton trucks with a load has made the trip from Worcester to Boston, 44 miles, in four hours' running time, and a number of Boston business houses and trucking concerns are looking into the truck with a view to adopt it for their purposes. The company have succeeded in producing a very satisfactory burner. Alexander H. Doe, formerly with the American Bicycle Company at Toledo, Ohio, has become connected with the Morgan Motor Company.

A new corporation are organizing to take over the business of the J. J. Warren Company, recently placed in the hands of a receiver. The new company will be incorporated under Massachusetts laws with a capital stock of $40,000.

The Houghton & Buxton Mfg. Company, makers of stamped metal goods, have taken the factory space formerly occupied by the W. H. Eddy Company, adjacent to the company's shops on Exchange street. The additional space will add 50 per cent. to the Houghton & Buxton Company's facilities, which was badly needed, the business having grown with great rapidity during the past year.

The Hobbs Mfg. Company are putting a new box manufacturing machine on the market, for which the demand is very great. There are 1500 paper box manufacturing establishments in the United States. The new Hobbs machine eliminates one process in the manufacture of box covers and of a paper box of small depth. The machine, which covers the side of the crude pasteboard box with paper, also stays the corners, the process formerly requiring a machine for itself. The Hobbs Company are taking on large additional floor space and are adding new machine tools.

The Boston & Maine Railroad Company have occupied their new machine shops in Worcester. The building is 40 x 170 feet and one story in hight. It is a part of a general power plant and roundhouse. The tools have been moved from the old Foster street machine shops and new tools will be added from time to time as they are needed.

The International Power Company have abandoned their Merritt air brake factory at Brooklyn, N. Y., which is one of their branches, and the machinery has been moved to Worcester and set up in the American Wheelock engine plant, at South Worcester. It was formerly planned that the International Power Company would manufacture the American-Diesel combustion engine at the Worcester shops, but after the company bought the big factory of the American Ordnance Company at Bridgeport, Conn., it was decided to utilize this larger plant for the Diesel engine. It is said that some of the smaller parts of the engines and perhaps certain sizes of the engine will be manufactured in Worcester. Worcester will be very well satisfied if the big shop on Southgate street is opened for business again, no matter what its product may be, for the place has been boarded up for several years, ever since the International Power Company abandoned their compressed air motor experiments here. Seven carloads of machinery from the Brooklyn plant have arrived in Worcester and have been unloaded at the shops at South Worcester. The Merritt air brake is intended for use on electric cars, and a number of street railway companies have already equipped their rolling stock with it.

President William P. Palmer of the American Steel & Wire Company has been in Worcester with a party of officials of the company, making a careful inspection of the works of the Washburn & Moen department. In the party besides President Palmer were First-Vice President J. S. Keefe of Chicago, Second Vice-President Philip W. Moen of Worcester, General Engineer Fred. H. Daniels of Worcester, General Superintendent C. L. Miller of Pittsburgh, General Sales Agent Frank Baackes of Chicago, Manager E. C. Lott of the Chicago district, General Purchasing Agent E. E. Stone of Chicago and General Auditor C. A. Vogt of Cleveland.

The New England Steel Roofing Company suffered a loss of $8000 by the fire in Day Buildings, Worcester, the company's quarters being thoroughly gutted. The loss is covered by insurance.

Alfred Waites, one of the head men of the sales department of the Washburn & Moen department of the American Steel & Wire Company, has resigned after 25 years of service with the Washburn & Moen office.

Clinton Alvord, for a number of years one of the chief designers of the Crompton & Knowles Loom Works, has left the employ of the company and entered into business for himself in the manufacture of carpet machinery. He has taken 10,000 square feet of floor space in Salisbury's Buildings. His specialties will be an improved printing drum and setting frame for the manufacture of tapestry Brussels carpets. Mr. Alvord has already installed a considerable amount of machinery and will add more tools from time to time.

The Plunger Elevator Company have taken the contract for two freight elevators for the new flatiron building at Broadway and Fifth avenue, New York.

The Consolidated Street Railway Company have placed an order for four 300 horse-power water tube boilers with the Altman-Taylor Company. The boilers will replace a portion of the battery at the Consolidated's Worcester station. The contract price is about $20,000. The Consolidated have also placed a $60,000 contract with the General Electric Company for the electrical equipment of 25 new closed cars now building for the company.

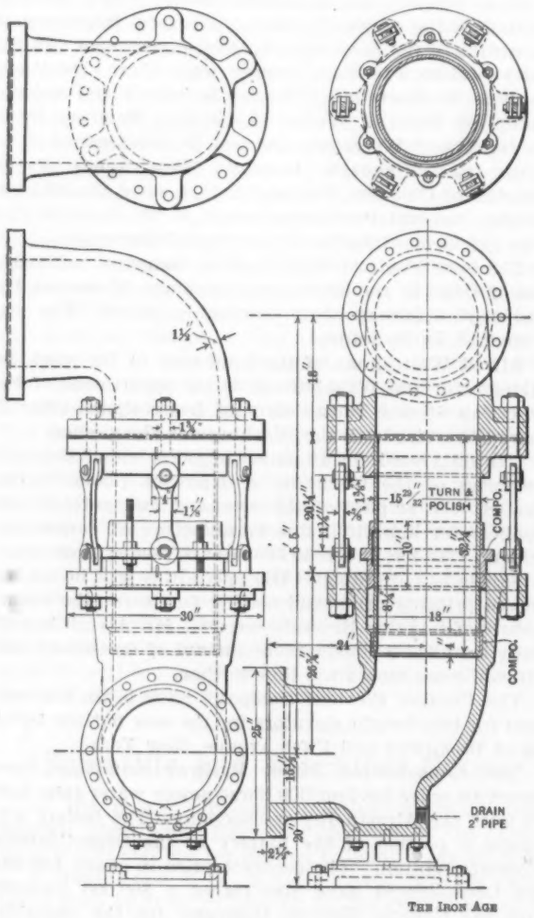
J. N.

The Liggett Spring & Axle Company of Allegheny have bought 40 acres of land for a plant and 40 acres of coal land on the Monongahela River, opposite Monongahela City, and will begin work within the next ten days on the construction of a rolling mill and axle plant. The company have been reorganized with $300,000 capital stock, which will be increased to $600,000. C. E. Champ of St. Louis, president and general manager of the Champ Spring Company, St. Louis, and of the Cincinnati & Hammond Spring Company, with plants at Cincinnati, Ohio, and Hammond, Ind., has been made president and general manager of the Liggett Company. W. E. Marquis remains secretary and treasurer, and with W. G. Park, formerly president of the Liggett Company, and others of Pittsburgh, form the Board of Directors. The plans for the new plant provide for a main building 600 x 110 feet, rolling mill 80 x 300 feet, which will contain two trains of rolls for rolling axle shapes, a turning shop, machine shop, hammer shop, warehouse and power house. The company will mine its own fuel. The Allegheny plant will be abandoned upon the completion of the new plant. The product of the plant is springs and axles for vehicles.

A Swiveling Joint for a 16-inch High Pressure Steam Main.*

BY R. E. CURTIS, BOSTON, MASS.

All engineers will probably agree that slip or swiveling joints in steam lines are commonly undesirable. Nevertheless, there are frequently cases in which some form of such joint cannot be avoided, and it becomes of importance to reduce their inherent disadvantages to a minimum. The swiveling joint here described was designed to meet a special situation, but its size and construction are such as, perhaps, to make it of some general interest. The problem presented was that of making a full sized connection between the ends of two 16-inch mains, carrying 160 pounds pressure, lying parallel



A SWIVELING JOINT FOR A 16-INCH HIGH PRESSURE STEAM MAIN.

to each other and of such length that the relative movement of the ends by reason of expansion amounted at times to several inches.

The first form of connection to suggest itself, and in all respects the most desirable, had it been practicable, was by a simple loop of pipe. A little calculation, however, showed that this could not be used without danger of excessive stresses being set up. Then several forms of flexible connection were investigated, and the final design adopted as being on the whole most satisfactory in the following particulars: *a*, reasonable form and dimensions; *b*, form and arangement of parts under stress; *c*, least number of joints requiring packing and removal of those from points where water might collect. All details were designed for a working pressure of 225 pounds.

Each joint consists of two elbows held together by a system of links—a flange bolted to the upper elbow and a length of pipe projecting downward from the flange into a stuffing box formed in the lower elbow. Two of these joints are used, the lower elbows being secured to the ends of the mains and the upper elbows joined by a length of pipe. The elbows and flanges are of air furnace gun iron, and are of substantial dimensions. The pipe is a piece of 16-inch outside diameter pipe, 15⅛ inches inside diameter, finished smooth on the outside. The gland and the ring at the bottom of the stuffing box are of composition, the former being held in place by six studs, three of which are long enough to hold it in a position to allow the packing to be easily gotten at. The ring and each end of the gland are made easy fits about the pipe. The endwise pressure is taken up and at the same time the rotation of the joint provided for by six mild steel links carefully fitted and so proportioned that the entire load can be borne by three with ample margin for safety. These links with their supporting bolts form a simple system, which assures a fairly even distribution of stresses, and is always open to observation.

Each complete joint is carried by a sliding support consisting of a chair cast separately (to avoid complication of the pressure part) and bolted to the lower elbow and a bearing plate anchored to the masonry floor. The stuffing box was made of generous depth, and so proportioned that metallic packing could be employed if desired, but so far only asbestos packing has been used, and the joint has ordinarily been perfectly tight.

Conditions unforeseen at the time of making this installation have led to a radical rearrangement of the entire system of steam mains, so that a connection of this kind will no longer be needed, and the swivels will go out of service during the present year. However, had this not been done, there is every reason to believe that they would have continued to serve satisfactorily as long as any other part of the mains. Certainly they have in almost three years of service proven so satisfactory and required so little attention that there would be no hesitation about duplicating the construction under similar conditions.

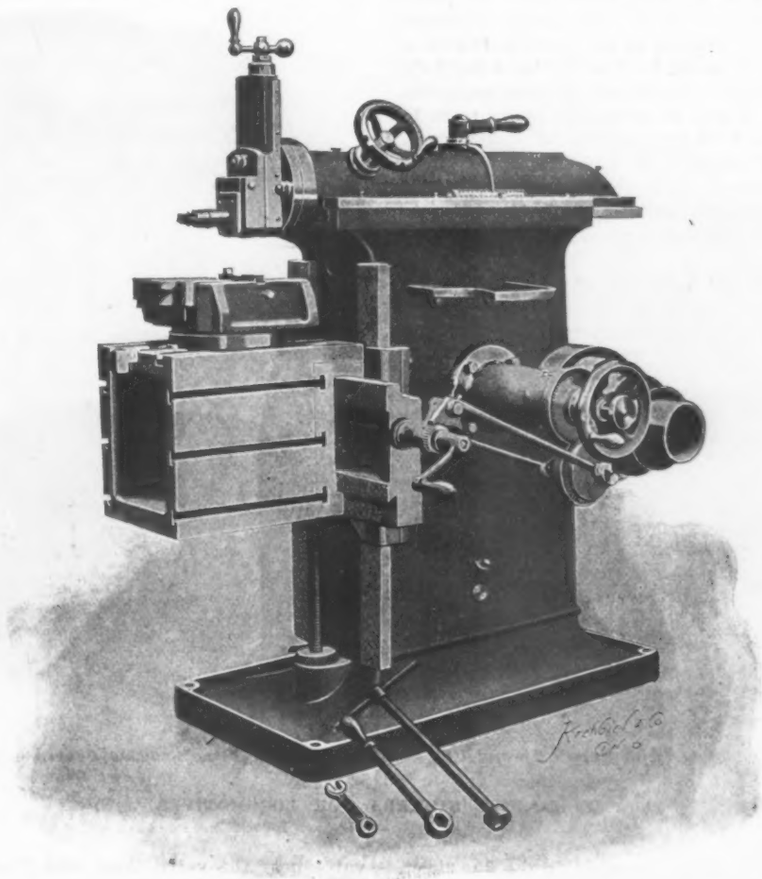
* Paper presented at the Boston meeting of the American Society of Mechanical Engineers.

The Nordyke & Marmon Company's Improvements.—The Nordyke & Marmon Company, Indianapolis, Ind., manufacturers of flour and cereal milling machinery, are receiving bids for the erection of a new foundry building, 135 x 335 feet, of steel construction, which will be equipped with the latest improved appliances. The company have, during the past three years, erected several large and substantial additions to their plant to accommodate their growing trade. These improvements consist of a one-story brick building, 55 x 245 feet, containing the planing mill and wood working department; a brick lumber storage building, with cement floor and transfer tracks, with a brick dry kiln, containing seven compartments for drying lumber, adjoining; a two-story brick building, 252 feet long, called the bench shop, in which machines composed largely of wood work are constructed; enlargement of the old planing mill room, 50 x 200 feet, to a three-story building, used exclusively for finishing, storage and shipping; a three-story brick building, used also for storage and shipping, one floor being arranged to accommodate overflow of work from the bench shop; a storage building for pig iron, scrap iron and all kinds of foundry supplies; a four-story brick building, 60 x 200 feet, two floors of which are devoted to the burrstone mill department, the upper floors being used as an addition to the bench shop department; two-story brick storage building, 60 x 100 feet, for belting, hardware and supplies of all kinds, castings, &c., and an addition to the office and drafting room. The company have installed a system of overhead tracks with air hoists of their own construction, which adds greatly to their facilities. In the machine shop they have installed a large number of machine tools, including a complete new shafting outfit. They have lately made use of a large room in the lower end of the machine shop for a complete line of machine tools for the manufacture of small parts of their machines and for the manufacture of certain lines of power connections. This department is a temporary arrangement to tide them over until the new foundry can be completed and the present foundry can be thrown into the machine shop.

The New American Tool Works' Shaper.

A recent disastrous fire in a Cincinnati foundry resulted in the complete destruction of all patterns covering the line of shapers manufactured by the American Tool Works Company of that city. Profiting by an extensive experience in the requirements of the trade, the firm took this opportunity to effect a number of radical changes in the sizes as well as the detailed designs of the machines comprising the new line.

The former line of shapers embraced the 15, 17 and 21 inch crank, 16-inch back geared crank, 26 and 28 inch triple geared; the new shapers will appear as 16-inch plain crank, 16, 18, 21 and 25 inch back geared crank, and 26 and 30 inch triple geared. The first of these to be brought to completion are the 16-inch plain crank and the 16-inch back geared crank shapers. We illustrate in the accompanying engraving one of the 16-inch plain crank shapers. This shaper is heavier and stronger in every way than its predecessor. The column, base, ram, table and so on have all been made of greater dimensions and weight, thus giving additional power and capacity to the machine, yet retaining its graceful, well proportioned, compact appearance. The stroke is positive and has five rates of speed. Its length may be changed at will without stopping the machine, and the index shown in the cut facilitates the setting of the stroke the length desired. The rocker arm is pivoted near the base line, and this gives the ram an almost uniform rate of speed its entire stroke and provides an exceedingly quick return. The rocker arm is of double section, permitting a 2½-inch shaft to be passed under the ram through the hole shown in the top of the column for key seating. This machine is susceptible of fine and positive adjustments while in full operation, rendering it especially adaptable to tool room work.



THE NEW AMERICAN TOOL WORKS SHAPER.

Die Stocks.—An important improvement has been made in the Forbes die stocks, manufactured by the Curtis & Curtis Company of Bridgeport, Conn. This is the adjustment of the shell or casing so that wear of gear may be taken up. In many machines for cutting and threading pipe the gear wears itself loose in the shell after a time, so that a perfectly straight thread is not easily obtained. This difficulty is wholly overcome in the new die and stock. The dies used are cheaper than solid dies and much more durable. All parts of the machine are interchangeable.

The German Iron Market.—A Berlin correspondent of the London *Economist*, under date of May 14, says: "The iron market remains rather quiet, but the improvement recently noted seems to be fairly well maintained. If there is any change, it is rather in the direction of diminishing demand. In the Rhine country there have again been some forced auctions of iron. The girder makers have just discussed an advance of prices, but voted to attempt no change, the establishments in Lorraine having opposed the increase. The manufacturers of half-finished products report that the export business continues good. The export drawbacks on raw material for export goods have been extended for the next quarter. The Dortmund Union, one of the largest of German iron companies (capital £2,100,000), which got into serious financial difficulties through the unwise policy of accumulating immense stocks of pig iron at a time when prices were high, and were then compelled to sell these at a loss, have just announced a plan for their financial reorganization, the chief feature of which is a reduction of the capital to £1,260,000, by writing off £740,000 as lost. The company have undergone, including the present instance, five reorganizations, which resulted in writeoffs from capital amounting to very nearly £3,000,000. The German Niles Tool Works, who began operations near Berlin a year and a half ago for the manufacture of heavy machine tools upon American models, reported in their annual meeting to-day that their deficit for 1901 reached £52,000. The business situation in the machinery trade is described as very unfavorable, and there are no indications of an improvement."

Mechanical Stokers for Locomotives.*

BY FRED. H. COLVIN, NEW YORK.

The conditions of locomotive practice are so different from those presented in the case of stokers for stationary boilers that they have seemed almost insurmountable, although much time and thought have been spent on them. These difficulties are not confined to the mechanical problem, for the selling of the locomotive stoker is an entirely different proposition from that in the stationary field. In the latter case it is an easy matter to show a marked reduction in labor cost, and this saving seems to appeal to buyers more than any other. In the case of the locomotive stoker there can be no reduction in labor cost, excepting in a few rare cases where two firemen are employed. This takes the cost of labor entirely out of the field, as it is not advisable to employ unskilled men on the locomotive equipped with a stoker, for in the event of the possible failure of the machine the engine must be fired by hand until the end of the run. It is also necessary to train engineers, and the only practical way of doing this seems to be by having firemen work with engineers as at present.

The practical advantages of the locomotive stoker can, perhaps, be summed up as follows:

Increased work from the locomotive, due to maintaining a maximum working steam pressure under all conditions of service.

Doing away with the necessity of constantly opening the fire door and admitting large quantities of cold air into the fire box, which opening tends to retard combustion and also has an injurious effect on the flue sheet.

Even distribution of coal over the whole of the grate, obviating thin spots through which cold air may be admitted with results as injurious as when coming through the door, or even more so.

Marked decrease in black smoke, due to the constant and steady firing according to the demands of the boiler.

Economy of coal consumption, resulting from the steady firing above referred to.

The Kincaid Stoker.

As the only stoker for locomotive use of which I know is the one invented by John W. Kincaid of Cincinnati, Ohio, formerly an engineer on the Chesapeake & Ohio Railroad, my paper will necessarily be confined to this machine and its work. Starting with the idea of producing a mechanical stoker which should take the place of hand firing, and realizing the difficulty of introducing or even experimenting with a stoker which would necessitate any radical change in the locomotive, Mr. Kincaid designed his stoker to be attached in place of the fire door. It will be noticed that it is a mechanical but not an automatic stoker, as the experience of the practical engineer showed that it was not feasible to attempt automatic stoking. While it is possible that ingenious mechanism might be devised which would regulate the amount of coal fired by the steam pressure in the boiler, it would greatly complicate matters and hardly be as effective as though under control of a skilled fireman. There are many cases, such as preparing for a hard pull up hill, where the fireman will anticipate the demand on the boiler and prepare for it, while an automatic device must follow the demand instead of anticipating it.

The Kincaid stoker is fastened to the fire door opening, as will be seen from the illustrations, Figs. 1 to 3, and consists of the hopper A, ram body B, ram cylinder C, steam chest D, door frame E, conveyor cylinder F, its valve chest, H, and the ram *b*. The conveying screws are actuated by the piston in cylinder F, which travels up and down and operates the screws by the ratchets shown, Fig. 1.

The amount of coal fed forward to the ram can be varied by regulating the amount of steam by a globe valve near the valve chest, and it can also be reduced one-half by throwing one of the screws out of gear.

A globe valve admits steam to the valve chest of the ram. The motion of this ram is controlled by an ingenious valve, which give three different strokes in regular order. The first stroke takes a full charge of steam and throws the coal to the front end of the fire box; next comes a medium stroke, which takes care of the middle portion, and lastly, a stroke which hardly does more than push the coal over the deflector plate, which is shown bolted to B.

It is sometimes asked how this action distributes the coal across the fire box, but the explanation is not difficult when we note that the exhaust from the ram cylinder passes along under the ram and goes over the deflector. It is an ingenious arrangement, and required considerable experimenting to secure the right shape for this plate. Mr. Kincaid tells me that during his experimenting he found certain shapes of deflector plates which would throw nearly all the coal along the sides of the box, and other shapes which would pile it up in the back corner. Any one familiar with the intense draft in a locomotive fire box would naturally credit this with a tendency to assist in the distribution, but I am informed that one of the first machines gave equally good results in a small electric light plant, where the draft was due only to a chimney.

That the distribution is practically perfect is proved by the fact that one of these machines has successfully fired several of the largest engines on the Chesapeake &

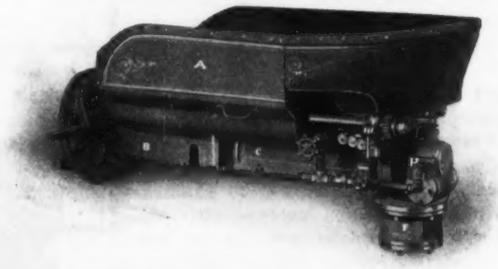


Fig. 2.—Stoker in Firing Position.

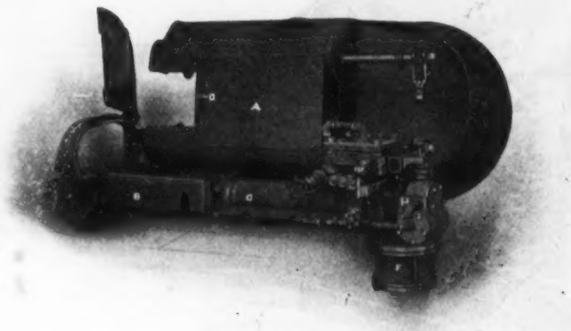


Fig. 1.—Left Side of Stoker with Hopper Thrown Up.

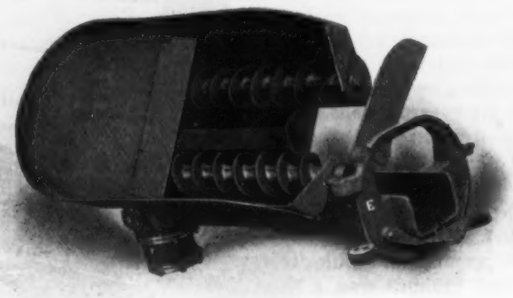


Fig. 3.—Top View, Showing Conveying Screws and Auxiliary Fire Door.

MECHANICAL STOKERS FOR LOCOMOTIVES.

* Abstract of paper presented at the Boston meeting of the American Society of Mechanical Engineers.

Ohio Railroad, in which the fire box was 41 inches wide and 11 feet long. It was my privilege to spend a day on one of these locomotives a little over a year ago, and in a nine-hour run the hook was used but three times. It is probable that even this would have been unnecessary but for the firing done at various stopping points to show the working of the machine to men who came on the engine. This rather clogged the fire and necessitated opening it up with the hook.

As an illustration of the range of capacity of this machine, it is interesting to note that the same stoker which fired the engine just referred to in my trip from Hinton, W. Va., over the mountains to Clifton Forge, Va., had been previously used on one of the lightest passenger engines on the division. Climbing some of the hardest grades over the mountains the stoker was speeded up to 18 strokes per minute; and as the average charge was 5 or 6 pounds, this gave from 90 to 108 pounds per minute, or from 5400 to 6480 pounds of coal per hour. The machine, however, has been run experimentally as high as 28 strokes per minute, and can, if necessary, throw a 10-pound charge at each stroke. This would give 16,800 pounds per hour, which is not likely to be called for in any practice or with any grade area which could be supplied by this machine.

It may be interesting to note that on the return trip of this locomotive it was fired by hand, and in spite of all the regular fireman could do he lost 50 pounds of steam in the first 12 miles. On the day previous this same fireman had no difficulty in keeping up steam almost to the popping point all the way up the worst hills on the division. This is self evident proof that the stoker enables the maximum work to be obtained from the engine. On this occasion, and in almost every case where the stoker has been tried experimentally, it is simply fitted to the fire door and the back end braced up with a block of wood, or possibly a false deck is put on the engine. This was the case on the large locomotive referred to, and the fireman was obliged to shovel every pound of the coal into the hopper, which was thus at an inconvenient hight; but in spite of this he told me that it was the easiest trip he had ever fired, as he was not subjected to the intense heat of the fire box at every shovelful. Only those who have stood before the open door of a locomotive fire box on one of these large engines hauling its full tonnage behind it can appreciate the ordeal to which the fireman is subjected almost constantly.

It apparently handles any kind of fuel from anthracite to lignite, and ranging from lump coal to slack. It is advisable, however, to have the coal broken to approximately uniform size, the same as in hand firing. On some roads this is done by machine before the coal is delivered to the engine, but most roads let the fireman do this himself. On the trip mentioned the fireman kept a small hammer ready, and simply cracked the large lumps. If, however, a lump larger than the size of the ram should get into the hopper and be caught by the ram it would lift the auxiliary fire door, which has an angle apron or lip for this purpose. This door is large enough to open for examination of the fire from time to time, or for using the hook if necessary, and in fact is as large as the opening of some of the fire doors used on a few of the Western mountain roads. With the hopper tipped back the locomotive could be fired by hand through this opening, but it is not necessary, as it is a simple matter to disconnect the steam pipe and swing the whole stoker to one side or even unhook it entirely. One of the engineers of the famous "F. F. V." train on the Chesapeake & Ohio Railroad told me of his experience with one of the first machines. A defective casting gave way when they were running at full speed, and the fireman disconnected the stoker, swung it out of the way and commenced firing by hand, without delaying him an instant or even causing him to ease up on the throttle.

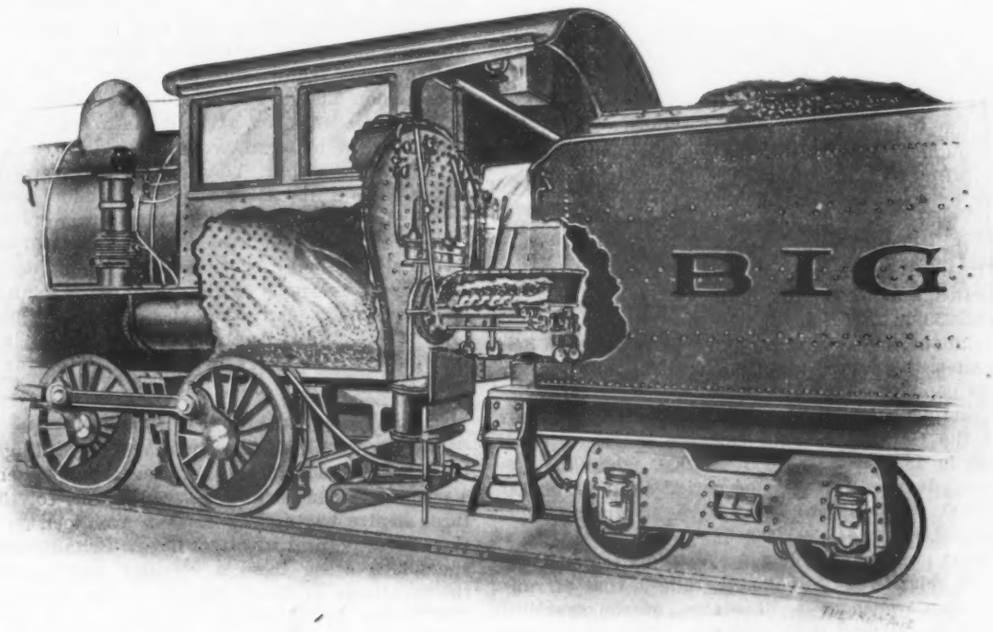


Fig. 4.—Stoker Attached to Big Four Freight Engine.

MECHANICAL STOKERS FOR LOCOMOTIVES.

I regret being unable to present any data as to the exact performance of these stokers, such as fuel economy, prevention of smoke, prevention of leaky flues and increase in tonnage, due to their use. I can, however, testify to the practical working of the device from actual experience, and am informed by W. S. Morris, superintendent of the Chesapeake & Ohio Railroad, and other officials, that there is a marked advantage over hand firing.

One road tried the stoker only on an engine which leaked so badly that it could not be run when fired by hand. It did run with the stoker, but this did not repair the engine, for, as Mr. Kincaid said, it was a stoker and not a flue calker.

While up to the present time the work with the stoker has been largely experimental, it is but fair to give great

credit to J. H. Day, a well-known manufacturer of Cincinnati, for his foresight and persistency in making it possible for Mr. Kincaid to devote his time to this invention. There is now no doubt as to the machine being thoroughly practical, and it is quite probable that within the course of a few months it will be manufactured on the scale it deserves.

Although primarily designed for a locomotive stoker it is admirably adapted for marine work with the Scotch boiler. The fact of requiring no special setting, but being attachable to almost any boiler without alteration, is sure to appeal to the man who pays the bills, as in case it should not meet all the requirements there is no expense or delay in taking out the device and substituting those formerly used.

Notes from Great Britain.

German Colonies and Their Trade.

LONDON, May 24, 1902.—The administration of the German colonies is fast passing out of the experimental stage, and becoming a matter of well-regulated routine. The German colonies may be roughly divided as follows: German East Africa, the Cameroons, Togo,German Southwest Africa, Samoa, New Guinea, the Carolines, the Marshall Islands and Kiao-Chou. It has been no easy task to organize the government of these various colonies, but it may now be said that peace and order reign throughout the greater part of German colonial territory. Punitive expeditions occasionally take place, but year by year the occasions for these diminish in number. The weakness of the position would seem to lie in the sparse white population in all these territories. In 1901 the white population of the four African protectorates numbered only 5571, as against 5112 in 1900 and 3239 in 1896. In Samoa the number of pure whites is about 450, and in the other German South Sea protectorates the figure is returned at 496. Small though the white population is, yet the trade done is for a beginning distinctly encouraging. The value of the imports in the German African colonies has risen from $5,000,000 in 1896 to $9,000,000 in 1900, while the exports have advanced in the same period from $2,750,000 to $3,500,000, the total trade, therefore, advancing from nearly $8,000,000 to $12,500,000.

The most pressing problem facing the German Government in relation to its colonial trade is that of railways. Cheap transport is, of course, of the first importance in developing new countries. Much has been done in the direction of making roads by native labor and in facilitating the landing and shipment of goods by harbor works and piers. But if the coffee and cocoa plantations situated far inland are to be profitably developed, it would appear that railways are an indispensable condition. The same remark applies to utilizing for export purposes the crops of maize, rice, &c., grown by the natives in the interior. The construction of railways in the neighboring African colonies by the British and the French will, it is thought, act prejudicially on the trade of the German protectorates, and fears are openly expressed that the Uganda Railway will divert the greater part of the trade of the northern portions of German East Africa and of Togo, trade which it is thought will be attracted to the railways in the adjoining French and British territories. On the other hand, however, it may be said that if the German protectorates cannot afford to have railways of their own, it is not to their disadvantage to be able to use those of other countries, particularly when the trade is of a nature that no immediate large developments can be expected. The question of railway transit is particularly pressing in German East Africa. Unfortunately, however, this railway question has assumed acute political importance in Germany, just as the Uganda Railway has been the subject of many an acidulated debate in the British Parliament. The proposed extension of the Tanga-Korogwe Railway to Mombo has been rejected by the Reichstag, while the question of government guarantee of the capital required for the construction of the East African Central Railway has also been temporarily shelved. It is stated, however, that the German Government mean to press the question forward at the earliest opportunity. While readily granting that the colonial administration is to be congratulated upon a certain marked progress during the past few years, it still remains an open question whether the energy and capital expended by Germany upon its colonies might not be much more effectively applied to home industries. The secretary to the British Embassy at Berlin on this point says:

"It must be left for the future to decide whether the hopes expressed in the official reports and by the advocates of an active colonial policy, or the pessimistic fears entertained by the opponents of such a policy, are the better founded. While there is a lack of initiative on the part of private capitalists to invest large sums in colonial enterprises, the Reichstag is not inclined to sanction the expenditure of public money on the construction of railways of which the financial success is not assured beforehand. Railways, apparently, in its opinion, must follow and not precede development, and it therefore turns a deaf ear to those who argue that an immediate outlay on railways would hasten the process of development, would gradually render the colonies self-supporting, and free the empire of the oppressive burden of its colonial subsidies."

Time will show, but personally I am inclined to the opinion that a great industrial nation, with ample natural resources, or at least with easy access to all requisite raw material, would be well advised to attend to affairs at home. The territories governed both by Great Britain and Germany are no doubt enormous in area, but population is thin and trade returns, even stated in the most roseate terms, are discouraging. Political questions are constantly cropping up, leading to embittered relations with other nations and causing enormous additions to the expenditure upon both armies and navies. As a commercial proposition, it seems to me that colonial policy is now and is forever bound to be a loss, a failure and a blunder.

Structural Steel in Great Britain.

I have just had the advantage of reading some interesting correspondence between the representative of a prominent American firm, well known for their structural steel work, and an English architect, on the question of structural steel in Great Britain. The correspondence arose from a circular letter addressed to the architects of Great Britain by the firm in question. The points of advantage claimed for structural steel by the Americans were briefly—utility, economy and beauty. The reply from the architect, who is a prominent member of the Institute of British Architects, is interesting in itself and distinctly characteristic of the British attitude toward structural steel buildings. He says, *inter alia:* "I am bound to say that while an architect can recognize clever engineering in such work, he must, in my humble view, forever dissociate it from architecture, and I trust that if ever our cities must, by want of space, be disfigured with these erections (which the fates forfend), may all true art lovers be at rest or in some other congenial sphere. I hope and believe, too, that the Royal Institute of British Architects will have become senile and impotent if it ever ceases to raise its voice against abnormal work that must kill architectural tradition. You will find this body took adverse action immediately the Strand scheme was touched, and if it does not continue to do its best to prevent disfigurement of our ancient capital, it will, I think, be unworthy of the support of the very humblest member of its ranks. Profit to the pocket as the highest good is, as I think history shows, the precursor of a nation's decay. Pardon the nature of my response, and accept good wishes for greater success in other engineering work." The Americans naturally did not lie down under this pronouncement, and genially responded: "Do you not think that use and beauty should be synonymous, that only the useful is really beautiful, and that all things that are commonly regarded as beautiful were at least at first made for utilitarian purposes, as, for instance, your types of stone columns and capitals are bad imitations of their wooden predecessors, the natural tree supports of the rough hut, the shape of which cus-

tom has made a religion? So in our ancestor worship we are sometimes required to conform in steel to the arch curve, which is the scientific (empirically discovered) line of equal or approximately equal compressive strain, and is consequently the economical form for a span made of non-adhesive and non-tensile resisting material like stone, but which is not as economical when material of great tensile resisting character like steel is used as the triangulated truss form, which is based on another natural scientific figure and an accompanying loss of rigidity, and so is entitled to equal honor. Do you not think the reasoning mind should accept our hypothesis that use and beauty mean the same things?"

Notwithstanding the British architects' æsthetic dislike of steel structures, there cannot be the slightest doubt that they are destined to become a very large integral part of building operations in this country in the near future.

Expected Changes in Armor Plate.

There are many rumors afloat in official circles to the effect that the British Admiralty propose discontinuing the use of Krupp armor. These rumors have their origin from the date of the last gunnery experiments carried out on the target section of the Belleisle, which represented sections of armored cruisers, and led the Admiralty to entertain serious doubts as to the value of Krupp armor. It is stated that although lyddite shell cannot pierce Krupp armor, yet the experiments proved that the impact of the shall caused pieces of the softer part of the armor to fall out of the back of the plates, while the hardened surface cracked with many small fissures. It is, in fact, proved that though lyddite cannot pierce 4-inch and 6-inch armor of this make, it can damage it considerably, while cap shell will perforate the plates. During the last Belleisle experiments, field shell pierced through the armor and did much damage to the interior of the target section. This fact has not been made public before, but it is now stated on good authority that the Admiralty is altering the designs of the new armor cruisers allotted to Clyde yards. Orders have just been placed for 9000 tons of armor plate, and as the cost exceeds £100 a ton, the new orders represent at least a million of money.

American Trade with Japan.

While the exports from the United States to Japan showed a considerable decrease in 1901 as compared with 1900, it must be remembered that this was due largely to the falling off in the quantity of raw cotton sold by America to Japan. A large increase was, at the same time, recorded in the American sales to Japan of kerosene oil, brought about in anticipation of the doubling of the import duty from October 1. In locomotive engines and machinery and other engines, and iron and steel, there was also a noticeable increase, but in the matter of rails and nails America fell back. The most interesting feature of the American trade with Japan is to be found in the locomotive trade. The duel which for some time past has been going on between American and British locomotives is being fought here as elsewhere. The facts are tersely stated as follows:

"Six American locomotives were ordered for the Hokkaido Government railways and a number for private institutions in the Main Island and Kiushiu. The Government Railway Bureau for the Main Island had specified for British locomotives only for some years past, but the last tenders, opened about the end of 1901, included one American maker, the Schenectady Locomotive Works, and four British makers. The order went to the United States, the cheapest British price for all 30 locomotives being $433,975; the amount for which the contract went is $387,210. This is the first time that the Government have placed British and American makers in competition on the same specification. The makers were given a free hand as regards design, and with the exception of the tires they were not bound to any particular manufacturers for the material. The specification was just such a one as British makers had been asking for, yet they were beaten in the contest." In addition to the locomotives which Japan bought from America, another valuable department is that of bridge work. It is undoubtedly the tendency of the Japanese Government Railway Department to specify for American makers only for material for truss bridges. Iron and steel amounting to about 1500 tons have recently been ordered by the city of Tokio to enter into the construction of road bridges for the capital. There is a constant demand for material for this purpose, as the city authorities are gradually changing all the more important bridges from wood to metal. It is imported in the form of bars and plates cut to the exact sizes specified. The work of making and erecting the bridges is given to local engineering establishments. There will doubtless be a further demand for structural steel in the near future, as the Japanese naval programme for the six years 1904-1909 will comprise 4 battle ships of 15,000 tons each, 2 armored cruisers of 9900 tons each, 4 second-class cruisers of 5000 tons each, 15 destroyers and 50 torpedo boats. With such an ambitious naval programme it really looks as if Japan is becoming quite civilized!

A Huge Span.

The largest bridge to be constructed in the United Kingdom since the Forth Bridge was built has just been commenced across the Tyne for the North Eastern Railway Company by the Cleveland Bridge & Engineering Company, Darlington. The contract price is $2,350,000. The present high level bridge, built by Robert Stephenson, cost $2,450,000, and has three sets of rails and a roadway underneath for ordinary traffic. The new structure is for railway traffic only, with four sets of rails, and will have two spans of 300 feet each across 600 feet of waterway, so that there will be only one central pier in the river.

A Swedish Substitute for Coal.

The manufacturers of Sweden are earnestly seeking for some substitute for coal. Last year they paid to other countries nearly $28,000,000 for coal. This is, of course, a serious handicap upon a country which otherwise is rich in minerals. The utilization of the peat mosses is the direction in which that attention is being turned. At present there is a proposal to apply to the Swedish Parliament for $416,650, to be used as a loan fund for the development of the peat industry, more particularly for the manufacture of peat for fuel, as also for peat coal and moss litter. A bill introduced last year provides that the State railways shall carry peat products at a reduction of 20 per cent., and further encouragement has been given to the movement by the appointment by the Government of a peat engineer. The high prices of coal in 1900 gave a great impetus to this movement for the discovery of cheaper substitutes. The manufacture of peat fuel cannot yet be termed a success, but there are 300 such fuel works already in operation in Sweden, and wide experiments are being carried out. It has been found in these that the comparative values of peat and coal are about 180 pounds of peat to 100 pounds of ordinary British steam coal, but peat mixed with equal quantities of coal gives about 14 per cent. better results than when used unmixed. S. G. H.

Caliper Gauge Forgings.—J. H. Williams & Co., of Brooklyn, N. Y., are producing a very complete line of forgings for both single and double end caliper gauges. As these are made of mild steel, refined and stiffened by drop forging, they are suitable for case hardening. At an extra cost they can also be supplied made of steel suitable for tempering. As the lettering panels and sides of the jaws are in the same plane they may be finished by a single grinding or polishing operation. These forgings are suitable for finishing to any of the usual forms of gauges of this kind. They are provided in an unfinished condition only.

R. T. Greener, United States commercial agent at Vladivostock, Siberia, reports that an anthracite coal mine was formally opened in January last at Su-chau, 60 miles from Vladivostock by sea and 100 miles by land. The mine is 13 miles from the sea, but will shortly be connected with Vladivostock by rail. The coal is stated to be of superior quality to Japanese coal.

THE MECHANICAL ENGINEERS.

THE BOSTON MEETING.

In the matter of attendance the forty-fifth meeting of the American Society of Mechanical Engineers, which was held at Boston last week, outstripped any previous record, in spite of the fact that the gatherings of this technical body have for years enjoyed the distinction of being the largest, in point of numbers, of all the engineering societies. Before the opening session more than 450 members and guests had registered at the headquarters in the Engineering Building of the Massachusetts Institute of Technology. Among those in attendance were:

Chas. Morgan of the Morgan Construction Company, Worcester, Mass., an ex-president of the society.
Charles W. Hunt of the C. W. Hunt Company, New Brighton, Staten Island, N. Y.
W. H. Wiley, treasurer of the society, New York.
D. S. Jacobus, Stevens Institute, Hoboken, N. J.
H. Binsse, Newark Machine Tool Works, Newark, N. J.
Col. E. D. Meier, Heine Boiler Company, New York.
T. R. Almond of Brooklyn.
George Richmond, New York.
H. H. Suplee, *Engineering Magazine*, New York.
Gus C. Henning of New York.
W. R. Webster, consulting engineer, Philadelphia, Pa.
Ambrose Swasey of Warner-Swasey Company, Cleveland, Ohio.
Alden, George I., M. E., Norton Emery Wheel Company, Worcester, Mass.
Allison, Robert, Franklin Iron Works, Port Carbon, Pa.
Archer, Edward R., chief engineer Tredegar Company, Richmond, Va.
Ashworth, Daniel, sales manager for C. W. Hunt Company, Pittsburgh.
Baker, Charles Whiting, editor *Engineering News*, New York.
Baldwin, Stephen W., New York agent Pennsylvania and Maryland Steel companies, 71 Broadway, New York.
Ball, Frank H., vice-president and general manager American Engine Company, Bound Brook, N. J.
Barrus, Geo. H., expt. and cons. steam engineer, Boston.
Bement, Clarence Edwin, superintendent E. Bement & Sons, Lansing, Mich.
Bole, Wm. A., superintendent Westinghouse Machine Company, East Pittsburgh, Pa.
Bond, Geo. M., manager Standards and Gauge Department Pratt & Whitney Company, Hartford.
Boyd, John T., manager the Yale & Towne Mfg. Company, 12 Pearl street, Boston.
Brooks, Edwin C., superintendent water works, Cambridge, Mass.
Bulkley, Henry W., M. E., 141 Broadway, New York.
Chandler, Clarence Austin, superintendent Washburn Shops, Worcester Poly. Inst., Worcester, Mass.
Christie, James, chief engineer American Bridge Company, Philadelphia.
Daniels, Fred. Harris, chief engineer American Steel & Wire Company, Worcester, Mass.
Dean, Francis W., mechanical and mill engineer, Boston.
Detrick, Jacob S., president Detrick & Harvey Mach. Company, Baltimore, Md.
Dodge, Jas. M., president Link Belt Engineering Company and president Dodge Coal Storage Company, Philadelphia.
Edwards, Victor E., M. E., Morgan Construction Company, Worcester, Mass.
Fellows, Edwin R., manager the Fellows Gear Shaper Company, Springfield, Vt.
Fisher, Clark, civil and mechanical engineer, Eagle Anvil Works, Trenton, N. J.
Fowler, Geo. L., cons. M. E., 53 Broadway, New York.
Freeman, John R., cons. hydr. and mill engineer, Providence.
Frith, Arthur J., engineer and contractor, 39 Cortlandt street, New York.
Fritz, John, cons. engineer, Bethlehem, Pa.
Gantt, Henry L., cons. engineer American Locomotive Company, Schenectady, N. Y.
Gleason, William, president Gleason Tool Company, Rochester, N. Y.
Gordon, Fred. W., vice-president Pratt & Whitney Company, Hartford, Conn.
Halsey, F. A., associate editor *American Machinist*, New York.
Hawkins, John T., mechanical engineer, Boston.
Herrick, J. A., cons. engineer and contractor, Philadelphia.
Hibbard, Henry D., Hibbard-Rodman-Ely Safe Company, New York.
Humphrey, George S., controller and purchasing agent C. W. Hunt Company, 45 Broadway, New York.
Hunt, Robert W., Robert W. Hunt & Co., The Rookery, Chicago.
Jacobus, D. S., professor experimental mechanics and engineering physics, Stevens Institute, Hoboken, N. J.
Kent, Wm., associate editor *Engineering News*, New York.
Kruesi, August H., designing engineer General Electric Company, Schenectady, N. Y.
Laforge, Fred'k Henry, chief inspector Conn. Mut. S. B. Insp. & Ins. Company, Waterbury, Conn.
Lanza, Gaetano, professor theor. and app. mech., Massachusetts Institute of Technology, Boston.
Laval, Carl Geo. de, manager Geo. F. Blake Mfg. Company, N. Cambridge, Mass.
Le Blond, R. K., president R. K. Le Blond Mach. Tool Company, Cincinnati.
Lewis, Wilfred, president Tabor Mfg. Company, Philadelphia.
Low, Fred. R., editor *Power*, New York.
McBride, James, superintendent N. Y. & Boston Dye Wood Company, Brooklyn, N. Y.
McKee, Joseph J., McKee & Milson, Bethlehem, Pa.
Manning, Chas. Henry, general superintendent Amoskeag Mfg. Company, Manchester, N. H.
Mesta, George, president Mesta Machine Company, Pittsburgh.
Miller, Fred. J., editor *American Machinist*, New York.
Mossberg, Frank, Attleboro, Mass.
Nason, Carleton W., president Nason Mfg. Company, New York.
Phillips, Franklin, Hewes & Phillips Iron Works, Newark, N. J.
Phillips, George H., M. E., Hewes & Phillips Iron Works, Newark, N. J.
Pomeroy, L. R., special rep. Railway Department, General Electric Company, 44 Broad street, New York.
Porter, Holbrook F. J., sales agent Bethlehem Steel Company, 100 Broadway, New York.
Quick, Howard Prescott, chief draftsman Boston El. Ry. Company, Boston.
Reist, H. G., mech. and elect. engineer General Electric Company, Schenectady, N. Y.
Richards, Francis H., mechanical engineer and expert in patent causes, 9-15 Murray street, New York.
Rogers, Winfield S., vice-president and general manager the Steamobile Company of America and of Roller Bearing Equipment Company, Keene, N. H.
Rohrer, Albert L., electrical superintendent General Electric Company, Schenectady, N. Y.
Roney, William R., M. E., Westinghouse, Church, Kerr & Co., 26 Cortlandt street, New York.
Rowland, Charles Bradley, mechanical and civil engineer Continental Iron Works, Brooklyn, N. Y.
Sargent, John W., Providence Engineering Works, Providence.
Schumann, Francis, M. E. and C. E., Philadelphia.
Sharpe, Henry D., assistant treasurer Brown & Sharpe Mfg. Company, Providence.
Smith, Jesse M., mechanical and electrical engineer, 220 Broadway, New York.
Smith, Oberlin, Ferracute Machine Company, Bridgeton, N. J.
Snell, Henry I., mechanical engineer, Philadelphia.
Souther, Henry, cons. engineer and steel expert, Hartford.
Spangler, H. W., professor dyn. engineering, University of Pennsylvania, Philadelphia.
Stearns, Albert, superintendent Church & Dwight, Syracuse, N. Y.
Stetson, George R., president and general manager New Bedford Gas & Edison Light Company, New Bedford, Mass.
Swasey, Ambrose, vice-president and treasurer the Warner & Swasey Company, Cleveland, Ohio.
Sweet, John E., president Straight Line Engine Company, Syracuse, N. Y.
Taylor, Stevenson, vice-president and general superintendent of W. & A. Fletcher Company, Hoboken, N. J.
Tilden, James A., general manager Hersey Mfg. Company, S. Boston, Mass.
Towne, Henry R., president Yale & Towne Mfg. Company, Stamford, Conn.
Victorin, Anthony, mech. and cons. engineer, Ordnance Office, War Department, Washington.
Walworth, Arthur C., president Walworth Constr. & Supply Company, Boston.
Warner, Worcester R., the Warner & Swasey Company, Cleveland, Ohio.
Webber, William Oliver, cons. engineer, Boston.
Wellman, Charles H., general superintendent Wellman-Seaver Engineering Company, Cleveland, Ohio.
Wellman, Samuel T., Cleveland, Ohio.
Wood, Erwin E., general superintendent Jones & Lamson Machine Company, Springfield, Vt.
Woodbury, C. J. H., assistant engineer American Bell Telephone Company, Boston.

The opening session on Tuesday evening was held at Huntington Hall, the proceedings beginning with an address of welcome by Dr. Henry I. Pritchett, president of the Massachusetts Institute of Technology, the oldest of the engineering schools, having been founded 40 years ago. Dr. Pritchett dwelt upon the importance of the engineering profession and upon the close relations between practice and theory. He emphasized the fact that the institution of learning must not alone provide the technical training, but must also make an educated man. A welcome was also extended to the society on behalf of the oldest engineering body in the United States, the Boston Society of Civil Engineers, by its

president, George A. Kimball, the designer of Boston's sewerage system and of its elevated railroad system. James M. Dodge of Philadelphia, the senior vice-president of the Society of Mechanical Engineers, responded felicitously for the visiting engineers.

THE WEDNESDAY SESSION.

On Wednesday morning the auditorium of the Engineering Building "B" of the Massachusetts Institute of Technology was well filled with delegates. The larger portion of the session was occupied in dispatching executive business. In the absence of President Edwin Reynolds, Vice-President James M. Dodge presided throughout the entire convention.

C. W. Hunt and D. S. Jacobus, tellers of election, submitted a report showing elections to membership as follows: Full membership, 57; promotion to full membership, 14; associates, 17; promotion to associate, 1; juniors, 49. The report stated that of 556 pink ballots cast, eight were thrown out, because of informalities.

The following communication received from Edgar Marburg, secretary of the International Association for Testing Materials, was read:

"The fifth annual meeting of the American Section of the International Association for Testing Materials will be held at the Hotel Traymore, Atlantic City, on June 12, 13, 14. Numerous papers on the physical and chemical properties of the materials of engineering will be presented at this meeting by recognized authorities, and certain features of the Standard Specifications on Steel Rails adopted by this society will be taken up for further discussion. The Executive Committee desires to extend a cordial invitation to the members of the American Society of Mechanical Engineers interested in these subjects to attend this meeting and to participate freely in the discussions. Copies of the programme will be gladly furnished on application to the secretary."

Fred. J. Miller of New York, after stating that he understood that the subject of amending the rules of the society was to come up before the convention, offered the following resolution:

Amendment of Rules.

"These rules may be amended by a letter ballot, at any annual meeting, by the assent of two-thirds of the members voting, provided that written notice of the proposed amendment shall have been given at the preceding regular meeting and that a blank ballot, accompanied by the mover's reasons for the change if he desires, and a comment on the same by the council if it so elects, shall have been mailed to each member entitled to vote, not later than the time of mailing the ballot for officers of the society. The ballots shall be voted and the result canvassed in the manner prescribed in Articles 33 and 34. The tellers shall immediately certify the result to the annual meeting, when, if the certificate shows that two-thirds of the votes cast are in favor of the amendment, it shall immediately take effect. This resolution is not intended, however, to deprive members of their right to vote by proxy, if they so elect."

The resolution was to supplement Article 45, which provides that the rules may be amended by a two-thirds vote of the members present at the annual meeting.

It was proposed to lay this resolution on the table, but Mr. Miller insisted on immediate action, which brought about a spirited discussion, and it was finally placed on file. Charles Whiting Baker and Gus C. Henning urged that if this resolution were passed it might force the society to send out trivial amendments, thus burdening the officers with unnecessary work and the society with avoidable expense. They held that amendments, though suggested by members and voted for by letter ballot, should pass the censorship of the council or Finance Committee before being sent out.

Henry R. Towne came to the rescue with the following resolution, which was passed:

"*Resolved*, That the chairman of this meeting appoint a Nominating Committee of three members here present which, before the close of this convention, shall report the names of three other members of the society, to constitute a Special Committee on Rules and Methods, which latter committee shall take under advisement the whole subject of the rules, by-laws and business methods of the society, including such changes or amendments as have been or may be proposed by members, and shall submit its conclusions and recommendations to the memberships in a report which shall be delivered to the secretary not later than October 15, 1902, and which the secretary shall thereupon cause to be printed and distributed to the memberships not less than two weeks in advance of the next annual meeting of the society."

The committee which Chairman Dodge appointed consists of Ambrose Swasey, W. O. Webber and John T. Hawkins. They, in turn, decided upon C. W. Hunt, H. R. Towne and Jesse M. Smith to serve in conjunction with them.

Report of the Council.

The report of the council on the finances and administration of the society, which was submitted by Secretary Hutton in compliance with the proceedings of the last December meeting, was assailed by Fred. J. Miller. He held that it was not definite enough. He criticised the wording as being indefinite and asked for a specific report from the secretary. He also called for information which was not included in the report and stated that the society's house in New York was an expensive luxury.

Harrington Emerson assailed the management in a somewhat reckless manner; he objected to some of the figures printed and to the method with which the council appraised the transactions of the society and other assets. H. R. Towne explained these apparent discrepancies and stated that during the last six and one-half months the society's indebtedness had been reduced about $3000.

Various methods of curtailing the expenses of the society were suggested, one of which was to save on the cost of printing and distributing the papers and proceedings. Jesse M. Smith objected on the ground that as an essentially engineering society the Mechanical Engineers should not curtail too much on the proceedings, which are vastly more important to the members than the saving of $2500 a year. He offered a resolution providing that all papers be printed and sent to all members prior to each meeting. After considerable discussion this resolution was laid on the table. He cited in support of his resolution figures showing increased interest in the proceedings of the American Society of Civil Engineers as a result of this procedure. Since sending out all papers to all members he said there had been an increase of 55 per cent. in the length of papers, an increase of 52 per cent. in the length of discussions, and of 141 per cent. in the number of discussions.

William Kent raised a point in reference to the character of the papers presented at the meetings, stating that some of them were a detriment to the society. He offered the following resolution, which was passed:

"The Publication Committee shall consist of the secretary and eight members, who shall be chosen by the council. The Publication Committee in its organization shall appoint from its members subcommittees of two members each on different special branches of the general subject of mechanical engineering. Every paper offered for publication by the society shall be examined by one of these subcommittees and approved in writing by both members of subcommittee publicly."

Committee on Metric System.

After stating that "on May 22, 1896, a subject was brought before the society which has been allowed to slumber until quite recently," Gus C. Henning quoted from page 223 of Volume IV of the "Transactions" regarding the appointing of a committee in reference to the adoption of the metric system of measurement, and said:

"Since the appointment of this committee, whose purpose was to prepare and have in readiness certain information, the society has not heard from it, and the data which it was requested to obtain has not been put on record in the archives. On the other hand, a member of this committee, pretending to speak in its behalf,

went to Washington to present personal views in opposition to a bill before Congress. This member made it appear that the American Society of Mechanical Engineers, through its committee, was strongly opposed to the introduction of the metric system into the shops of the country. The same member of this committee furthermore, and as if writing by instructions thereof, addressed the daily press in the same manner. Again the secretary of this society took similar action by writing a long official letter on the society's paper to the Congressional Committee, which also made it appear that the American Society of Mechanical Engineers was strongly opposed to the compulsory introduction of the metric system.

"It is an established principle of this society neither to indorse, approve nor recommend reports of committees. It is, furthermore, far beyond the scope of this society to appoint committees for the purpose of affecting legislation. Nevertheless, the secretary of this committee stated before the Congressional Committee that this society had adopted and approved the report of a committee on the decimal gauge for standard dimensions. We find, furthermore, that this committee and the secretary have tried to affect legislation by making it appear that this society was strongly opposed to the introduction of the metric system.

"In view of the foregoing facts, it is my opinion that those members of the metric opposition committee and all others who have taken part in this public agitation should be requested to abstain from further utterances and communications."

He offered the following resolution and it was adopted:

"*Be it resolved*, That hereafter all committees and officers of the society and council present their reports to the society or its council for review and approval before publication; and further, be it

"*Resolved*, That no member of the society nor officer thereof, or of the council, shall attempt to represent the society for any purpose whatsoever without written instructions from the council; and that the present metric opposition committee be excused from further considering the subject before it, and members be appointed thereon who are more in harmony with the customs and practices of this society."

Discussion of Papers.

In the morning session of Wednesday there was time for but two papers, both of which brought out considerable interesting discussion. The first presented, that of Prof. D. S. Jacobus, was submitted as the final report of the committee appointed to codify and standardize the

Methods of Making Engine Tests.

It was not, however, a final report, as the discussion which followed its reading necessitates further consideration on the part of the committee.

William S. Monroe, after complimenting the committee on the thorough manner in which it had investigated the subject, ventured the opinion that it might have been better to adopt a simple and concise method of testing, which would bring out a definite and incontrovertible standard of determining efficiencies. The report, he said, is intended to present a method of testing an engine, and yet it includes a complete test, not only of the condenser, but also of the feed pumps and boilers, and to some extent of the piping as well. He expressed himself as very strongly of the opinion that the engine test should stop with the engine, and that the efficiencies should be figured between the heat in the steam at the throttle and that in the steam in the exhaust pipe just outside of the low pressure cylinder. He continued by explaining that in the large plants of to-day the condenser arrangements are so varied that they cannot be considered to form any positive portion of the engine itself. He also mentioned the usual inefficiency of engines driving the air pumps, and alluded to the confusing comparison which would result from the driving of pumps electrically. He mentioned the fact that in street railway and electric lighting work especially the guarantee is almost invariably based on certain conditions of steam at the throttle and a certain vacuum in the exhaust pipe. These plants, he said, were representative of the best practice of the day, and he doubted the possibility of obtaining a complete test in any of them in any other manner than by the system of cost sheets, showing the cost per unit per output of fuel, labor, &c., from month to month. In such cases, he continued, it was very possible, however, to test separately the boilers, engines, condensers, pumps, heaters and other auxiliaries, and it would be of great value to have a code for each, and, if possible, a code for testing the entire plant. He stated that it would be more in accord with the tendencies of modern practice to make the engine code refer to the engine alone. He concluded his discussion by suggesting that in the practical testing of steam engines important corrections are sometimes necessary, and that it would be very desirable if a code bearing the authority of the society could give a standard method of making these corrections. In this connection, he said: "I have in mind a guarantee test of a 1200 horse-power engine in which I was recently interested. The contract stated that the engine would be supplied with steam at 150 pounds gauge pressure and superheated 60 degrees at the throttle, and that the vacuum in the exhaust pipe would be 26 inches. On the test the steam was found to be superheated about 100 degrees and the vacuum was 25½ inches. It would have saved an immense amount of discussion and annoyance if a code adopted by this society had given a standard method of calculating the proper correction to be made for the difference between the actual superheat and vacuum from those required by the contract."

Charles L. Heisler, in speaking of the importance of perfect separation of all moisture from the steam and the impossibility of obtaining a sample of the steam mixture from which the percentage of moisture can be accurately determined, suggested that the calorimeter should be used to indicate or detect any trace of moisture which may pass through the separator; in other words, its function should be to detect the slightest imperfection in the working of the separator rather than to attempt the impossible task of accurately measuring the actual amount of moisture mixed with the steam passing to the engine. He suggested that while amply efficient for doing ordinary work, the commercial separator is not near enough to perfection for use in refined tests. He stated that a very much higher degree of refinement is attained with the cream separator, and mentioned a steam separator built on similar lines to the cream separator which students of the Pennsylvania State College devised and which he said proved successful.

E. T. Sederholm said in part: "The committee, while not advising, yet permits the use of water meters. Yet we know that even the best of them are notoriously inaccurate, and even the degree of inaccuracy is erratic. A little air in the water plays havoc with them, or a short stroke now and then is something that may go undetected during the calibration test." He criticised the arrangement of the valves in the sketch showing meter connections, and stated that the committee leaves the door wide open for obtaining any results desired when it recommends that leakage of circulating water into the vacuum space of the surface condenser may be allowed for. Leakage of any amount, he said, should simply invalidate the test. Leakage from the air pump, he said, should not be allowed unless it is actually caught and measured. He also voiced the opinion that the committee was in error in suggesting that where very large quantities of feed water had to be dealt with the orifice method may be adopted. He said that nothing but direct weighing or measuring in carefully calibrated tanks can be relied upon at all. He also objected to the establishing of the term "commercial ratio of expansion" in place of the actual ratio, citing as an instance the diagrams of the steamship "Iona's" engines, where the commercial ratio shown is only 19.28, while the actual ratio is 30.3.

The Committee Report.

The entire committee consisted of George H. Barrus, Francis H. Boyer, Bryan Donkin, D. S. Jacobus and George Richmond. It was appointed in June, 1898.

From the report of the committee we take the following:

"As a first step, selection must be made of the units upon which the results of a standard test should be based and the form in which the results should be expressed. The only common ground on which the various classes of heat engines stand is that every one depends for its operation upon the use of heat. Steam boilers are of variable efficiency, even with fuels of identical quality. In a steam engine the weight of steam consumed is an unsatisfactory measure of performance, for the reason that the true thermal economy is affected by the amount of the initial pressure, by the quality of the steam and by the disposition which is made of the rejected heat of the engine. Measurement on the heat unit basis takes account of all these variables. It seems to be a foregone conclusion, therefore, that the standard of consumption, not only for steam engines but for all classes of heat engines, should be referred to heat units.

"The expressions of eugine economy which meet all the requirements noted are the number of heat units consumed per hour, both per indicated and per brake horse-power, and these we recommend as the desired standards of comparison. The heat unit standard does not interfere in any way with the common terms of expressing economy of engines. The hourly weights of coal, gas, oil or other fuel, or weight of steam consumed per horse-power, heretofore commonly employed, are additional forms of stating economy, and are none the less useful within their limitations. They should by no means be abandoned. Neither should the standard forms recommended for expressing the duty of pumping engines, or the efficiency of locomotives, previously accepted by the society, be changed, as they do not conflict with the proposed new standard. In the scheme now presented by your committee these additional or subsidiary forms of stating economy, as applied to particular classes of engines, are suitably provided for.

"The heat unit expression of economy does not in itself show whether the engine is working to its best advantage any more than the expression of the steam consumption; this must be determined by an analysis of the conditions as to initial and final pressures, cut off, &c., under which the engine works.

"The heat consumption of a steam engine required for the standard test is ascertained by measuring the quantity of steam consumed by the plant, calculating the total heat of the entire quantity and crediting this total with that portion of the heat rejected by the engine, which is utilized and returned to the boiler. The term 'engine' as here used should include the entire equipment of the steam plant which is concerned in the production of the power, embracing the main cylinder or cylinders; the jackets and reheaters; the air, circulating and boiler feed pumps, if steam driven; and any other steam driven mechanism or auxiliaries necessary to the working of the engine. We believe that the heat unit standard makes it both desirable and obligatory to thus charge the engine with the steam used by necessary auxiliaries, for the reason that it is itself finally benefited, or should be so benefited, by the heat which they return; it being generally agreed that exhaust steam from such auxiliaries should be passed through a feed water heater and the heat thereby carried back to the boiler and saved.

"We have embodied the British standard in this code as one of the subsidiary forms of expressing economy, but we consider that in most cases sufficient accuracy will be obtained by taking the heat returned to the boiler as that corresponding to the temperature of steam at the pressure of the atmosphere for non-condensing engines, and to the vacuum in the condenser for condensing engines, in place of that corresponding to the pressure in the exhaust pipe.

"We have chosen as one of the important subsidiary forms of expressing efficiency that based on a so-called 'standard coal' unit. The assumption is made that the heat consumed by the engine is generated from coal of a fixed heat value, as implied by the term 'standard coal.'

"In carrying forward our work the general plan followed is: First, to satisfy the special object in view—that is, to lay down the form of test which shall serve as a standard for all steam engines, whatever their service—viz., the heat unit test; second, to supplement the standard system thus framed with provisions for systematically determining other forms of expressing efficiency of steam engines, as in cases where it is desired to base the economy on the steam or fuel consumption; third, and as a further supplement, to standardize the methods of testing steam engines and results obtained with reference to their particular service, so far as this has not heretofore been accomplished, and fourth, to systematize the work of testing gas, oil and other internal combustion engines.

"To make the work complete attention has been given to the subject of commercial tests of steam engines—that is, to coal tests of the combined engine and boiler under conditions of commercial use. Such tests are of the greatest importance to the user of a plant and they demand consideration.

"In treating of the subject of engine testing as relating primarily to the determination of matters of economy, it must not be forgotten that capacity is often of even greater importance than economy. In that large class of steam engines which are required to run at a certain limited and constant speed there should be a considerable reserve of capacity beyond the rated power. It is our recommendation that when a steam engine is operating at its rated power at a given pressure there should be a sufficient reserve to allow a drop of at least 15 per cent. in the gauge pressure without sensible reduction in the working speed of the engine, and to allow an overload at the stated pressure amounting to 25 per cent."

The Committee on Standard Pipe Unions presented a supplementary report which contained several criticisms of the union proposed by the committee in their previous report. This report will be printed in full at a later date.

Specifications for Steel Forgings, Castings and Boiler Plates.

William R. Webster submitted the specifications for steel forgings, steel castings and steel boiler plates which were prepared by Committee No. 1 of the American Section of the International Association for Testing Materials, as "proposed specification," and adopted as their standards by the American Section in their convention last June.

Gus C. Henning read a lengthy paper opposing the specifications. He reviewed the history of the efforts of the International Association of Testing Materials to obtain harmonious international co-operation in securing standard specifications. He also stated that those proposed by Mr. Webster were not in keeping with those generally adopted abroad. He urged that the specifications indorsed by the society should be such as to not only meet with the best practice in this country, but also be in harmony with European methods. Regarding the specifications advocated by Mr. Webster's report, he said they "are wanting in many respects, they prescribe some material which should not be used in any case, specify test pieces and methods of testing which are unreliable and do not give accurate knowledge. Methods of inspection are practically omitted altogether. Their worst characteristic is, however, the fact that in many points they are directly opposed to the interests of the producer, and must cause the rejection of much material which should be entirely satisfactory, and which would fill the requirements when subjected to correct tests."

The test pieces and methods, he said, were those used in this country 25 years ago, and that hence European engineers believe that we have learned nothing in this matter during a whole generation. He then proceeded with a minute dissection of the specifications, laying special stress upon the fact that he thought the 2-inch test piece for forgings 6 inches too short. He gave a careful definition of the terms "elastic limit" and "yield point" as he thought they should be, and suggested a method by which he thought these tests should be made. He said: "The elastic stretch up to the yield point of test pieces 2 inches long will be but one-quarter of the amounts stated—viz., 0.00275 and

0.0044—which are such minute dimensions that they cannot serve practical purposes or be observed by the naked eye." The compilers of these specifications, he said, "know that this minute extension of 2-inch test pieces does not produce drop of beam in a manner similar to the 8-inch lengths, and hence specified the determination of what they called the elastic limit, which by the method presented for its determination, is clearly nothing else than the yield point." He said that in Europe the 8-inch, or 200-mm., test piece has been adopted as the standard length. He closed by stating that the provision that the test piece may be cut from the sink head in connection with steel castings is very objectionable because of the possibility of segregation and of slag and dirt being in it, and he condemned the terms "drop" and "percussive test," saying that they should be called the "breaking down" and "hammer tests."

Mr. Webster, in his reply, stated that the specifications did not attempt to follow European practice, but simply endeavored to take care of American practice. The 2-inch test piece, he said, was the size used by the United States Government.

S. M. Vauclain said:

"These specifications are the result of a great deal of patient work by the committee, and the table attached to them gives the specifications that were considered in reaching their conclusions. In their present form they are too cumbersome for practical use. What is really required is to subdivide them that they may be thoroughly digested and put in shape for use. There may be some points in the specifications that might be modified to advantage. I therefore ask that this association appoint a Committee on Specifications, as has been suggested, believing that the result of its work would be of great assistance toward standard specifications."

No action was taken in reference to the appointment of a committee.

Francis B. Allen said:

"Relative to proposed specifications for steel boiler plate and steel castings, one cannot even casually look at the report as presented by Mr. Webster and his associates on the committee without being impressed with the care and attention they have exercised in the examination of authorities on this subject and preparation of data in such shape as to make the record of those authorities of easy reference.

"The subject, in my judgment, is one of the most important that could engage the attention of this society, for while the question is of great professional and commercial importance, it is even more important on the score of humanity, for it has to do with the protection of life and limb by establishing standards for high grade material in boiler construction and attachments whereby life can not only be made safer, but it will also establish a responsibility for those who fail to provide the best material under conditions in which it is evident the best is demanded.

"The demand is for higher steam pressures on boilers, yet in cases where the purchaser is willing to pay for the best and safest material for the purposes they are to be used, there is no absolute guarantee in many cases that it may be obtained. In other words, that the purchaser will get what he pays for. If manufacturers of boiler tubes, steam pipes and steam fittings were required to legibly stamp their product, as the manufacturers of boiler plates do, the protection of their own interests would be an incentive to produce the best instead of the cheapest.

"It is a practical question of some importance, if we build a high pressure boiler, parts of which are subject to test and are demonstrated to be of the best steel plates and workmanship obtainable, and then use tubes, steel pipes, steel castings and steel fittings attached to it of unstamped and absolutely unknown qualities, where all parts are to be subject to the same high pressure, if we are not guilty of a very reprehensible act—and yet, is not this being done every day? By all means let us favor standard specifications as the most practical way to secure the best materials and best workmanship, and provide means of identification for all the parts, so that we may not only be able to intelligently select the best, and thereby make the whole boiler structure uniformly safe, but also, where any detail is not up to the trade representation credited an article of that quality, that we may know to whom legitimately to attribute the fault.

"I therefore hope this important subject may be continued to a future meeting, for it is more important that it should be settled right than at this time; also, we may show a creditable appreciation on our part for the excellent work of the committee."

Tests of Steam Pipe Coverings.

A paper read by George H. Barrus was a record of tests made at the new power station of the Metropolitan Street Railway Company, New York. The facts contained in this paper were printed in *The Iron Age* at the time of the tests. In the discussion Prof. D. S. Jacobus produced the results of a series of tests, which, although made under different conditions, showed a remarkable similarity in results as to the large percentage of saving effected by using coverings.

William W. Crosby said:

"It is an accepted fact that in any steam plant the special fittings and other surfaces not provided for by molded or sectional coverings form from 20 to 35 per cent. of the whole. Prof. C. L. Norton of the Massachusetts Institute of Technology alludes to this fact in the report of his tests on pipe coverings in no uncertain terms. The tests referred to in Mr. Barrus' paper do not take account of this fact, but consider only sectional covering. From a practical standpoint, therefore, the results of these tests cannot be taken as a guide in the solution of problems of covering in general. It is to be regretted that plastic coverings were not included, for commercially they are so important.

"It is noticed that the so-called low pressure used was 80 pounds per square inch. This is a rather high figure for low pressure and does not give much of an idea of the action at 10 pounds to the square inch or less.

"In table No. 8 a period of five years is assumed as a basis for figuring costs. No account seems to be taken of the fact that some of these coverings contain organic matter, which subjects the coverings to the possibility of deterioration."

Charles R. Pratt presented a paper on "Elevator Safeties," which, aided by a stereopticon, proved very interesting, but failed to elicit discussion. Various forms of elevator safeties were described and illustrated, and the defects of some were pointed out. A new safety which Mr. Pratt has produced was shown to remedy the objectionable features of the others.

In view of the selection of Boston as the place of meeting, R. E. Curtis presented an interesting description of the Atlantic avenue station of the Edison Electric Illuminating Company of Boston. This was of particular interest to the delegates who intended visiting this station on Thursday afternoon.

In another column we print the paper of R. E. Curtis describing a swivel joint for a high pressure main. This paper was supplemented by J. D. Riggs, who mentioned the fact that four years ago, in connecting four large engines to their boilers, a swivel joint was used successfully and in an interesting manner. The openings of one of these engines was 18 inches in diameter and of the three 16 inches. They were located about 15 feet from the wall of the mill, 12 feet above the floor and from 60 to 70 feet apart. The distance from the boilers to the nearest engine, he said, was about 200 feet. The problem was solved by running two lines of pipe, one 20 inches in diameter and the other 18 inches in diameter, along the wall of the mill, and putting T's opposite the first and third and elbows opposite the second and fourth engines, opening upward, and on a level with the engine openings. A length of pipe about 11 feet long, with an elbow on each end, completed the connection. These elbows are standard fittings, with tongue and groove for packing, but the bolts used here were ¼ inch larger in diameter and the bolt holes at the head end of bolts were elongated to allow the elbows to swivel on their horizontal faces.

It was necessary to use this form of joints, owing to the presence of a traveling crane. He stated that they have been working satisfactorily under a pressure of 120 pounds.

R. H. Fernald of New York presented a paper showing

Working Details for Gas Engine Test.

"Considering the rapid advance of the gas engine during the past few years, it is surprising to find how little has been done toward standardizing such engines, or at least toward adopting some form of test whereby a definite idea of the relative merits of different engines can be obtained. Of late years the market has been crowded with various types and modifications of heat engines, especially of the explosive type, many of which are mere freaks and of little or no value.

"Although a very few types have received the careful attention of the expert, many engines thrown upon the market are the results of a desire to invent, with the possible chance of 'hitting the right thing,' or the product of dull times in machine shops.

"Although in the case of the steam engine occasional forms are produced having entirely new features, yet the tendency is to conform closely to a general standard which usage and careful investigation have shown to be desirable.

"Similar standards should be adopted for the gas engine as rapidly as possible. This does not prohibit or discourage invention or modification, which are very essential in the present condition of these engines, but something should be done to classify and standardize those already on the market, thus determining what experience and study have thus far shown to be good form.

"The problem in its entirety is a large one, and will require many months or perhaps years of continued investigation and study. With this fact in mind, the writer has undertaken a few months' study of the subject, and although unable more than to begin the work, the results so far obtained may prove of interest to this society.

"Before the engines can be standardized some definite method of determining the relative merits of different engines must be settled upon, and this leads at once to the necessity of a standard method of testing gas engines."

The paper then showed a table which Mr. Fernald had prepared giving features which should be included in specifications of gas engines. The tests which formed the basis for the paper were carried on at the mechanical laboratory of Columbia University, largely from work on a 6 x 12½ Otto engine and a 6 x 9 Nash engine. A form of report blank was also included as well as general directions to be followed during the test. The instructions for conducting tests were given in detail.

Prof. C. H. Robertson in discussing the paper objected to the statement made by Mr. Fernald that two or three hours is not a long time for tests, and in some cases it may be necessary to run several hours. He stated that while it is not suggested that ten minutes is always long enough, most gas engine tests, not involving a gas producer, are longer than they need to be. He suggested that it is often desirable to have a counter for registering the number of explosions, operated by the force of the exhaust. Another counter attached to the gas inlet valve arm serves to show the number of inlets, and the comparison of the readings of these counters at once gives clear evidence as to whether the igniter is working properly. He said also that under some conditions of testing there will be charges that are missed even when the igniter is in proper working condition. In connection with the ratio of revolutions to explosions, he suggested that it may be well also to note the sequence of the explosions, stating that in a number of governors the explosions usually will come two, three or four in succession, and then there will be a number of blank charges. He suggested that a satisfactory method to determine the accuracy of indicator rigging is to get an engine up to the speed and then close the gas valve and hold the indicator pencil against the drum for several revolutions. The pencil will, of course, travel up and down the compression curve, and if the indicator rigging is accurate the up and down strokes of the pencil will coincide. Any inaccuracy, as far as angular adjustment is concerned, will be made apparent by a loop instead of a single line.

In preparing the details for the foregoing paper Mr. Fernald had his attention directed to the necessity of an accurate and inexpensive method of determining the temperatures of exhaust gases. For this purpose he had devised an apparatus consisting essentially of two cylinders of sheet iron, one 10 inches in diameter and the other 14. They were 16 inches high. The 10-inch cylinder, after being generously perforated near the bottom, was placed inside the 14-inch cylinder, the latter having several deep notches cut out at the top. A cover of the same material and 15 inches in diameter was made, with a central hole about 2½ inches in diameter, through which the exhaust pipe from the engine could be passed. A T was placed as close to the exhaust outlet of the engine as possible, and from it one line of pipe was run directly to the exhaust muffler, as usual, and the other line brought out horizontally and at right angles to the first, and then directed downward to the receiver just described, the end of the pipe projecting about 2 inches through the cover into the inside cylinder.

Valves were inserted in both pipes, so that the passage of the gases to the receiver or to the muffler or to both at once could be regulated at will.

In the receiver the gases were passed downward through the inside cylinder, out through the perforations and upward between the two cylinders, finally passing out through the notches in the top of the outside cylinder. The object of this arrangement was to prevent any direct draft or chimney action, which would cause an inrush of cold air at the bottom as soon as the inlet valve was closed. Two holes, large enough to receive the thermometers, were punched in the cover, one midway between the center and the inner wall and the other about ½ inch from the inner wall. The exhaust was directed to the receiver, and after being allowed to flow until the cold air in the receiver was entirely expelled was shut off and the therm meters quickly inserted.

This construction was modified and improved upon somewhat as the experiments related were continued.

Charles E. Lucke of New York presented a paper telling of an interesting series of experiments conducted at Columbia University in connection with the subject of "Liquid Fuel Combustion."

THURSDAY.

Gus C. Henning opened the session with a description and exhibition of a roller extensometer containing several new features.

The paper of Fred. H. Colvin on "Mechanical Stokers for Locomotives," which appears in full in another column, called forth a good deal of interest. The general sense of the remarks was that the very heavy locomotives that are in use nowadays are beyond human capacity in the matter of fuel consumption. One man cannot fire fast enough and it would be impracticable to have more than one to an engine. In view of this situation it was held locomotives will sooner or later be compelled to depend upon mechanical stokers for their firing.

George L. Fowler named one slight difficulty met with in firing locomotives mechanically. He said that it was not always possible to distribute the coal well in the rear corners of the fire box. In the front, he said, the coal is distributed very evenly. In reply to an inquiry as to the method of cleaning the fire, Mr. Fowler replied that as it was necessary to have a skilled operator for the machine and as it could be swung away from the firing hole, the fire can be cleaned just as it always has been. The shaking of the grate, he said, is also accomplished in a similar manner. Another feature which he claimed for the mechanical stoker is that it keeps the door closed during the time of firing and there is good smokeless combustion.

Albert R. Mansfield of Salem, Ohio, presented an

argument in favor of a new indicator cock for engines, which consists of the ordinary three-way indicator cock with a fourth connection underneath. This fourth connection may lead to the steam space of the engine throttle or to the exhaust pipe; or, when used on the low pressure cylinder of a compound, to the receiver space. Its object is to present a means of measuring the drop of pressure due to resistances in the pipe line between a boiler and an engine. These resistances are often caused by too sudden changes of direction of flow or too high velocity of steam, or both.

In a paper on "Electricity in Cotton Mills" W. B. Smith Whaley of Boston touched on the point of negative frictional losses. In describing an installation which he had made in a cotton mill, he said:

"It should be borne in mind that the nature of the service—namely, the alternating current with induction motors—is quite different in its action from the direct current or similar conditions in a belt or rope driven mill. The effect of acceleration is reduced practically to zero in this type of electric mill; there is a fixed ratio in the speed of the generators and motors which will not permit one part to accelerate in revolutions or retard over another; in electrical terms, this is caused by the fact that within the range of the torque of the machines the step of the machines in phase with the system will not permit of any increase in speed without stopping any machines which get out of phase. The generators running in parallel are always in step and cannot change, consequently it is impossible to speed up or down one part of the plant over another due to variation of the work.

"The motors all run at the relative speeds compared to the generator for which they were designed, and any tendency to acceleration is checked and results in a diminution of the torque or displacement angle due to the fly wheel effect of the armatures; within this range the entire tendency to vary the speed is absorbed. They are General Electric motors, Type I, 8 poles, 150 horsepower, 600 revolutions per minute at no load, and 588 revolutions per minute at full load, running at 550 volts. A few are of less power, but are of the same type. The accumulated energy causes an apparent reflex action of current, and the only effect which occurs is a reduction of the power absorbed by the system, which instantaneously adjusts itself between the motors and the generators, and reduces, as shown in the horse-power tables taken from the engines, the amount of power consumed in the cylinders, the speed at all times being practically constant. Under these conditions an absolutely steady speed is maintained, and the entire tendency to acceleration or retardation is absorbed in the machines themselves, insuring an absolutely uniform application of power at all times throughout the plant."

William S. Aldrich stated that the question of negative frictional losses is not entirely new. He cited instances such as the series of tests made by Pike and Hugo, on the Minneapolis & St. Paul system. The direct current railway generators were all driven by expansion engines, some belted directly, others through counter shafting, with or without friction clutches. Such an installation, he said, afforded an excellent opportunity of observing the effects of mechanical inertia—the so-called fly wheel effect of the transmission machinery. In this test, he said, sometimes the mechanical (engine) was in excess of the electrical (dynamo) horse-power, and just as often the reverse was the case. Messrs. Pike and Hugo, he said, showed that when the electrical railway system was lightly loaded the difference between the mechanical and electrical powers was often minus, therefore the dynamo was delivering more power than the engine received from the steam. Frequently, all the losses included in the average frictional 150 horse-power would be completely nullified, while from some source the dynamo received energy to supply the traction line with current. He cited other instances where similar results were obtained and said that the question to be answered was, How much is due to bad regulation of prime mover, how much to fly wheel effect, and in the alternating current system how much to the action of the induction motor as a generator, when from any cause it is allowed to run at a speed above that at which it is synchronized with the generator?

Prof. Charles H. Benjamin of Cleveland said:

"A year or more ago I directed some tests which were made by one of my senior students in several machine shops in Cleveland where electrical transmission is employed wholly or in part. The results of these experiments bear directly on the question of the efficiency of this form of transmission as a substitute for shafting and belting. I will call these four shops by the numbers one, two, three and four. In No. 1, where direct current motors were used, no indicator cards were taken, the power being determined by readings of the electrical instruments. In the other three cases the horse-power under different conditions was determined from the indicator cards. In shop No. 4 the governor was driven by belt from the main shaft of shop, the system being only partial. In No. 3 the average power consumed by crane was deducted in getting the per cent. of loss. The examples given are not at all in the same class with those mentioned by the author of the paper, representing much smaller installations and a different kind of work, but it is interesting to make the comparisons. A table which I have compiled shows that the percentage of friction loss is much greater, averaging about 40 per cent. of the total power, or 50 per cent. of that delivered by the generator. The power consumed by the engine and excitation of field is no small item, being 30 per cent. in shop No. 2 and 15 per cent. in shop No. 3. All of these losses are relatively larger because of the fact that the generators were not loaded to anywhere near their full capacity. These experiments point to the same conclusion as those made elsewhere, that the use of electrical transmission with the group system of driving in machine shops entails about the same percentage of friction loss as that resulting from ordinary shafting transmission."

George L. Fowler, in answer to Professor Benjamin, said that there are other considerations to be taken into account in connection with the driving of shops electrically by group system, such as the allowance for crane service, which would be impossible in a shop encumbered with line shafting. He said that even though the electricity itself may not show a saving, there are other economies that make its adoption profitable, especially where force is needed at infrequent intervals, as is often the case where heavy machines are in operation. H. H. Supplee cited as an indirect advantage that of floor space, saying that sometimes the saving is as much as 40 per cent.

"Some Details of Direct Connected Generator Sets" were contained in a paper by William H. Bryan of St. Louis. The subject of uniform shaft dimensions and bore of armature hub was discussed at length, and as to the matter of overload we quote:

"Is the overload limit of 25 per cent. recommended by the committee wise? Most generator builders now guarantee their standard machines to safely carry 50 per cent. overload for one hour or longer. Should not the engine have a similar margin? Often the peak of the load lasts but an hour or so, and it is better engineering to run at reduced efficiency for this short period, rather than to invest a greater amount in a unit which will be underloaded for the rest of the 24 hours. This can be accomplished by a later cut off, if the engine is structurally strong enough. Part might also be gained by running up the steam pressure a little, but this is not always permissible.

"It is to be hoped that engine and generator builders will promptly carry out their agreement as to early compliance with the details established by the society's Committee on Standardization, and that there will result great shortening in the time now necessary to agree on shaft data. May the day speedily come, also, when a similar agreement may be reached as to standard sizes of alternating and railway generators."

In the discussion J. B. Stanwood of Cincinnati said:

"The scheme of standardization seems to depend to a great extent upon the establishment of armature bores. With these bores well fixed for different sizes of units and for the two classes of engines, center

crank and side crank, the dynamo builder is enabled to manufacture his armatures in quantity, thereby cheapening the cost and facilitating the delivery of the generators; the engine builder is in a similar position with the shafts for the forgings, especially for those of center crank engines, can be kept in stock in anticipation of orders, and the finished length and fit can be made on short notice after the entire engine is built. To the committee it seemed more practical that the generator builder should fix the bore and that the engine builder should work to gauges furnished. The engine builder can more easily grind the shaft to a fit than the hole can be bored and scraped to a gauge. As to overloads, the committee considered that a too large overload capacity would tend to low economy in the engine. With some types, notably noncondensing compounds, the maximum load is the most economical one; so to call for great overload engine capacity would compel engines of this class to operate a large portion of the time at low rates of economy."

Walter M. McFarland of Pittsburgh sent the following remarks, which were read by the secretary in connection with this paper: "With respect to the question of overload limit, it should be noted that the recommendations of the committee in section 10 of its report were entirely at the request of the engine builders. As Mr. Bryan correctly states, dynamo builders are prepared to guarantee an overload capacity of 50 per cent. for an hour or longer, and it would have been entirely agreeable to the members of the committee representing electrical firms to have had such an overload rating. I am sure that if the engine builders on further consideration cared to have the committee's report amended so as to allow 50 per cent. as the overload, there would have been no objection on the part of the committee."

A method for finding the acceleration of the cross head for any given angular position of the crank was contained in a paper by J. H. Le Conte of Berkeley, Cal.

THE FRIDAY SESSION.

The closing session of the convention was held in the lecture room of Pierce Hall, at Harvard University, Cambridge. The first paper read was by R. H. Soule of New York on the subject of

Technical Index and File.

He said in part:

"The index card chosen as being most convenient is a medium heavy white card, approximately 3 x 5 inches (actually 7½ x 12½ cm.), ruled with horizontal blue lines, and punched near the lower edge; in the Library Bureau catalogue this is classified as their 33 *r* white card.

"The file boxes are of three different sizes, the inside dimensions being as follows: Small size, 7 x 10 x 3 inches; medium size, 9½ x 12¾ x 3 inches; large size, 11½ x 16½ x 3 inches. They are all similar to pamphlet cases in general make up, and open both at one side and one edge, the two hinged covers of each box being fastened together by a simple catch, which is opened by pressure of the thumb. These file boxes are not to be found in stock, but can be made by any manufacturing stationer. The small size box takes pamphlets, trade catalogues, &c., of the 6 x 9 inches standard; the medium size box takes publications of approximately letter size, including both trade catalogues, technical papers, &c.; the large size box takes the larger technical papers; blue prints may be taken in either size box to which they will conveniently fold. The three sizes of file boxes are arbitrarily designated as P, L, and G (pamphlet, letter and gazette), and each box bears on its back its appropriate designating letter.

"All pamphlets, technical papers, &c., containing item or article which is considered worthy of being indexed are checked; the reading matter is cut up into single sheets, by running a paper cutter through the binding edge; those sheets which do not bear a check mark on either side are taken out and discarded; those sheets which do bear one or more check marks on either side are then bound together by metallic binders, after which the proper file number is placed in the upper right hand corner.

"Each size of file box has its own series of file numbers running from 1 up, and each inclosure prepared for filing (as above described) is marked with both its proper file letter and number, the first of each series being marked *P* 1, *L* 1 and *G* 1; each subsequent inclosure bears the next consecutive file number to the last one previously used in its series. In assigning the inclosures to the file boxes size alone determines; no classification by subject is attempted, that being taken care of by the card index; no vacant numbers or spaces are left and each series is filled up solid.

"After the file inclosures are prepared and given their file numbers the checked items and articles are indexed by making the proper entries, by subject, on the index cards. The general subject is entered at the top of the card, nothing else being put on that line; six additional lines (seven in an extreme case) are available below and these are used for consecutive references to the general subject, after which additional cards are used. The index references to inclosures in the file give the name of the technical paper, in abbreviated form, and the year of publication; it has been found to be unnecessary to give the month and day; they can be ascertained by reference to the file itself, if needed. The index also contains references to sources of information outside of the file."

H. P. Smith of Boston found fault with this system, inasmuch as the subject must be gotten at solely through the cards because the box is not labeled as to subject. He favored a larger size of card, 4 x 6 inches, which would contain more complete data. The box, he said, should be 8½ x 10½ or 9 x 12 inches, so that publications will lie flat, and the boxes should be labeled as to subject as well as numbered. With boxes lying flat, the numbers could be placed on front and labels bearing subjects of matter contained could be placed on the lid. He said that subjects should be kept together regardless of size. He advised the binding into volumes of all important trade periodicals.

G. T. Voorhees of Boston urged the adoption of the inch sizes of cards, as then the metric cards, which are slightly smaller, could be filed in connection with the inch cards. He urged manufacturers to supplement the catalogues they issue with a standard size of card containing a synopsis of the catalogue information and reference to the filing of the catalogue. By glancing over the card, he said, the purchaser could get a good conception of the article manufactured and would not be compelled to wade through a lot of unnecessary matter.

H. H. Suplee of New York said that the filing of clippings by subjects and also run cards according to subjects entails unnecessary work. He suggested numbering all clippings regardless of subject and placing them in series of hundreds. The card system should then be kept up properly according to subject, each card telling numbers of clippings to the subject.

G. L. Fowler of New York urged the importance of issuing catalogues according to standard sizes, stating that he paid no attention to catalogues which were not made up in standard size.

A. M. Lane of Meriden, Conn., spoke of the necessity of destroying the cards, as well as catalogues, when they became obsolete, in order to prevent carrying dead wood in the card case.

Oberlin Smith of Bridgeton, N. J., said that destroying all catalogues that were not of standard size was like cutting off the nose to spite th eface.

The next papers presented were "The Lowell Gas Light Company's Coal Pocket" and V. E. Edwards' paper, "The Flying Shear." The latter is printed elsewhere in this issue. These papers elicited no discussion.

H. M. Lane of Scranton, Pa., read an interesting description of the repairing of a broken cylinder. The cylinder was 60 x 100 inches, and belonged to a horizontal blowing engine. A full description of this work will be presented, together with illustrations, in a later issue.

The paper of C. C. Tyler of Pittsburgh on a proposed

Standard for Machine Screw Thread Sizes.

called forth considerable comment, but no definite action. This paper, together with the complete discussion, will be printed in a later issue.

J. D. Riggs of Pittsburgh presented a paper on "Cold Working of Sheet Metal in Dies." A number of remarkable examples of this class of work were referred to, and they brought out many additional illustrations of remarkably rapid work from various members.

A resolution of thanks to all concerned in making the convention pre-eminently successful was passed by a standing vote, and the work of the convention was finished.

While from the point of numbers in attendance and work transacted the Boston meeting of the American Society of Mechanical Engineers was most successful, the work of the local committee was the subject of much praise. The arrangements were complete in every detail and admirably executed. The entertainment of the visiting ladies was excellent. On Wednesday morning coaches conveyed about 200 ladies to the suburbs, a luncheon being served at Auburndale. Another excursion to the suburbs was made on Thursday morning and the participants joined the delegates at Rowe's Wharf, all leaving for a delightful excursion down Boston harbor to the Fore River Ship & Engine Company's plant at Quincy. Some of the members stopped to visit the plant of the Edison Electric Illuminating Company *en route*. On Wednesday afternoon a tour of the buildings of the Masachusetts Institute of Technology was made. The delegates were divided into groups and different routes taken, so that all could see the various laboratories without confusion. This was very successful, and many remarks were heard regarding the completeness of the institution and the excellent work produced by the students, especially in the mechanical laboratories.

The trustees of the Museum of Fine Arts and the local committee tendered a reception to the members and ladies at the Art Museum on Thursday evening. This was a brilliant affair and was enjoyed by all.

During the closing session on Friday the delegates and ladies were guests of Harvard University. After the business session at Pierce Hall luncheon was served in Memorial Hall. President Eliot of the university delivered a brief address of welcome, in which he stated that it was the first time that an outside organization had dined in Memorial Hall, which was responded to in a hearty manner by Vice-President James M. Dodge. The afternoon was spent in the inspection of many interesting buildings.

Trade Publications.

Gas and Gasoline Engines.—The last catalogue of the Stover Engine Works of Freeport, Ill., describes their latest types of gas and gasoline engines, and presents engravings of some of the uses to which these engines can be put. Their 1½ horse-power engine was designed especially for those who needed a small power. It is put together in the factory before shipping, and is complete on one foundation. The engine is built so that it can be easily removed from place to place as occasion may demand.

The Niagara Hydraulic Engine, built by the Niagara Hydraulic Engine Company of Chester, Pa., is a modern development of the old-fashioned hydraulic ram, but is as different from the clumsy machine with which most people are familiar as an electhic arc light from a tallow dip. It is a direct acting machine and will run on so slight a head or fall that it is practicable to use it in places where other machines have failed.

Metal Balls.—The Automobile & Cycle Parts Company of Cleveland, Ohio, turn out over 500,000 balls every day, made of steel, brass, bell metal and bronze. The company regard the matter of accuracy secondary to that of hardening and uniformity of material. Their chief aim, therefore, is to get stock which at the outset of manufacture is certain to work well, and which when hardened and ground can be converted into what are perfect spheres.

Drills, Taps, Dies, Reamers, &c.—The Etna Mfg. Company, 40 John street, New York, have prepared an attractive catalogue of their cutting tools, consisting of taper, straight and square shank dies, drills, straight and taper reamers, taps, dies, milling cutters and slitting saws. These are all made in a complete line of sizes.

The Crucible Steel Company of America have issued a revised export list of their different steel products.

Marine Gasoline Engines.—Owing to an increased demand for larger marine gasoline engines, the Mianus Motor Works of Riverside, Conn., have decided to add to their list a larger engine of the four-cycle type. The smallest engine of this type will be 12 horse-power, double cylinder. This company also manufacture various kinds of hoists and other apparatus to be used in connection with their engines for both stationary and marine work. The marine hoists are used for hauling dredges on oyster boats, pulling lobster pots and traps and fishing gear, driving pound poles, &c.

Standard Electrical Materials, as manufactured by the Peru Electrical Mfg. Company of Peru, Ind., consist of sockets, receptacles of all the well known patterns, cut outs, switches, fuse rosettes and blocks, simple circuit boards, porcelain insulators, and so on.

Wire Rope and Cordage.—A catalogue by the A. Leschen & Sons Rope Company of St. Louis describes the wire rope and cordage manufactured by them and considers the usage to which such materials are subjected. The durability of wire rope depends principally upon the diameter of the sheaves. The greater the size of the sheave the longer the rope will last. Experience has demonstrated that the wear increases with the speed; it is therefore better to increase the load than the speed. One-fifth of the ultimate strength of the rope is considered a fair working load. Wire rope should not be coiled or uncoiled like hemp rope. When not on a reel it should be rolled on the ground like a wheel or hoop, to prevent kinking or untwisting. Their flattened strand ropes are free from all tendency to kink, and a considerable saving in wear of pulleys and sheaves is effected by their smooth surface. They have 150 per cent. more wearing surface than ropes of the ordinary pattern.

Blow Off Valves.—A circular from the Chapman Valve Mfg. Company of Indian Orchard, Mass., describes the Morris blow off valve. This valve is designed for a working steam pressure of 250 pounds. The valve disk has a renewable soft metal ring, which can be easily changed by removing the piston portion of the valve disk. These rings are cast in a metal mold and require no finish. The bronze ring seats can be easily taken out of the body and refaced in case they should become worn or injured. These valves are made with flanged ends and are fitted with bolt follower stuffing box, packed ready for use.

Elevator Motors.—A pamphlet by the Holtzer-Cabot Electric Company of Boston describes their electric elevator motors and illustrates one of each of the various types which have been adapted to this service. These motors possess the following qualities, which are absolutely essential to any successful motor, namely: Round mechanical construction and heavy and durable insulation, compactness, slow speed and a rigid diameter of commutation.

Foundry Facings is the title of a short treatise by the S. Obermayer Company of Cincinnati. The most common facing is sea coal or bituminous facing. This is the only facing known which is not put on the face of the mold, but is mixed with the sand in the proportion of one shovelful of coal to 10 or 20 of sand. This mixture is placed nearest the surface of the mold in order to break up the particles of sand, which is then not so liable to fuse when the metal is run in. The coal cokes and passages are formed for the escape of the gases. This leaves the sand in a separated condition, so that when the casting is cooled the particles of sand will drop off. All other facings are dusted on the mold, applied with the hand or with a camel's hair brush, and can be used wet or dry, as the work may require. In order to produce a good casting a facing or blacking is needed that will close up the pores of sand on the face of the mold and so produce a smooth surface or veneer. The best material for this is what is termed plumbago or silver lead. Mineral facing is made from an anthracite coal or low graphite carbons, and is used on work when a particularly smooth surface is not required.

The Iron Age

New York, Thursday, June 5, 1902.

DAVID WILLIAMS COMPANY, - - - - - - - - PUBLISHERS.
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RICHARD R. WILLIAMS, - - - - - - - - - HARDWARE EDITOR.
JOHN S. KING, - - - - - - - - - - BUSINESS MANAGER.

Peace in South Africa.

One of the most important events of the past week, and certainly the most important from an international standpoint, was the announcement that peace had been concluded between the British and Boers in South Africa. The war lasted nearly two years and eight months, and though at first it was classed as one of England's "little wars," it proved exceedingly costly both in the loss of lives and in the expenditure of money. It has been a very serious matter for Great Britain, but still more serious for South Africa, which was developing rapidly. The world at large has been affected by the reduction in the output of gold from the mines of the Rand, which has thus withheld from the stock of precious metals an enormous sum. At the same time manufacturing interests in this country and in Europe have felt the reduction in the demand for mining machinery and other supplies from that part of the globe.

The extent to which the gold supply of the world has been cut down by this disastrous war is shown by the statements recently made regarding the gradual increase in production through the reopening of the mines in the Transvaal. The monthly production of gold by these mines prior to the outbreak of the war had gone beyond 400,000 ounces. This production fell to practically nothing for the greater part of the war, and only during the closing months of the past year did the yield amount to anything considerable. It is estimated that in December the output reached 52,000 ounces. Since that time the production rapidly increased from month to month, and according to the latest information it has now grown to about one-third of the normal output. It may confidently be expected that the production of gold will from this time more rapidly increase, until the former maximum is reached and surpassed.

The benefits to be derived from the restoration of South African mining, agricultural and transportation interests to their normal condition may be overestimated by the people of Great Britain. They, however, have for a long time entertained quite extravagant ideas relative to the great purchases of machinery, railroad material and other supplies which would follow the cessation of hostilities in that region. While these views may be too hopeful, as they usually are, yet undoubtedly a great deal of material must be purchased to replace that destroyed by the devastations of war. Much more may be expected to be purchased by reason of the more thorough development of the mines and other natural resources of South Africa. It is known that in many rich sections the development of these resources was discouraged by the Boers, who feared that their exploitation would lead to further undesired immigration. With this obstacle removed, it is to be expected that the development will proceed on a much broader scale and thus greatly increase the demand for all kinds of machinery and supplies. In this trade the United States may be expected to participate. John Hays Hammond, the South African mining expert, who reached this city from England last week, stated in an interview that large machinery contracts will doubtless be fulfilled now which were suspended during the war. He further stated that preparations are being made to push forward work in the South African mines as rapidly as possible.

While the American manufacturers of mining machinery are so actively employed at present that additional contracts for early delivery are not eagerly sought, nevertheless sufficient capacity can probably be found available to take a good share of orders if such should be forthcoming from South Africa. Possibly this country may not for a time receive many contracts of this character. Our interest in the increased business in South Africa may thus not be very direct. Nevertheless, if the business thus originating gives greater employment to British establishments or to manufacturing industries in other parts of the world, the effect will be beneficial to this country, as our interests are so interwoven with those of the world at large that we necessarily must feel whatever operates to their advantage. The point is made that even now very large quantities of goods have accumulated at South African ports in anticipation of peace, and that really active undisturbed shipments to the interior will not be possible until the greater part of the army has been withdrawn. In any event, the termination of the Boer war may be regarded as an important addition to favorable business conditions.

Working Lower Grade Ores on the Lake Ranges.

One of the suggestive features of present day mining in the Lake Superior region is the increasing demand for lower grades of ore. Ores that a few years ago were regarded as valueless, ores from mines that were idle because of their inferiority, lean Bessemers, low grade siliceous ores, limonites and other classes of ore, are now sought for and are easily sold. This condition exists on all the lake ranges, but is especially noticeable on the Mesaba, perhaps chiefly by reason of the hitherto almost scornful neglect of these ores on that range. It is not out of the way, perhaps, to estimate that about 2,500,000 tons, not far from 25 per cent. of the total from that range, will this year be of siliceous low grades, largely non-Bessemers, that will not average above 58 per cent. in iron. A large part of this quantity will be under 57 per cent. Attempts are made to tone up some of these ores by the mixture of a better grade at the docks, and the result is an ore that will be a point or two higher. Many of the shippers, however, are not making this attempt, some of them because they cannot, others because they do not consider it necessary. This low grade ore is not all going to the furnaces of the miners; much of it is being sold on the market, and seems to have no great difficulty in making a place for itself at a reasonable price, a price that admits of a small profit. Two or three years ago the lessees of one of the largest Mesaba mines were wasting in their stripping ore running up to about 55 to 57 per cent. in iron. It required considerable effort on the part of the feeholders and their agents to induce the mining company to save this ore in piles by itself. In so short a time have conditions changed that this ore is now available for shipment, and if it is not shipped this year from this very mine the reason is one entirely aside from the economic situation.

In explorations for new ore bodies on the Mesaba range this year but few bodies of high grade ore are being found. It is now figured by exploring syndicates and by many operators purchasing ores in the ground that anything running above 55 per cent. in iron is merchantable. A number of sales of ore lands have been made this year in which large bonuses have been paid for 20

and 25 cent leases upon ores running from 56 to 58 per cent. Perhaps the most notable of these has been that to the Deering Harvester Company of a tract in the western part of the range, where $525,000 was paid for a property shown to have 9,000,000 tons of ore averaging 58 per cent. To get this average much ore under that percentage was included, and much will probably be shipped from the 9,000,000 tons that will not come anywhere near 58 per cent. This bonus averaged $60,000 per 1,000,000 tons. Several properties in the central part of the range, near Mountain Iron, have been sold of late on the basis of a bonus of $25,000 a million tons for ore, held under 25-cent leases, that runs from 56 to 57 per cent., and is non-Bessemer. A property is being opened further west whose average analysis is not over 57.50 per cent., and is non-Bessemer, with none too excellent a physical structure, the royalty on which at a heavy minimum is 30 cents a ton. Another western Mesaba property has recently been disposed of under an agreement as to the total tonnage that may be found, and the stipulation is that all ore that can be averaged up above 55 per cent. iron is to be included in computations. These are not exceptional instances; the facts are that they are now the rule, and the higher grade ores are the exceptions. Big prices have been paid for leases on these less than 60 per cent. ores when the mining was a serious matter, on account of water, deep surface and other considerations.

The same conditions prevail on older ranges. Mines are in operation on the Marquette range that were attempted and abandoned two or three years ago on account of the "leanness of their ores." Now they are apparently satisfactory to those operating them, for additional properties of the same class are being taken for future work. Large tracts containing, it is presumed, an ample tonnage of lean siliceous ores to last many years have been purchased by large interests. These ores are expected to show analyses of about 40 per cent. iron and from 25 to 35 per cent. silica. These are valuable in part, for their mixture with the higher grade Mesaba ores, carrying little silica, but these ores will doubtless be mined extensively on their own merits in due time. On the Menominee range ores are being taken that were a few years ago considered without any value.

The situation is not alarming, as indicating an expected shortage of high grade ores that must be looked for and prepared against, but it is interesting as evidence of the changes in conditions that are taking place in all the lake ore districts.

Food for thought is furnished by some figures which have recently been issued concerning the Japanese mercantile marine. It appears from a statistical statement published by the Japanese Minister of Communications that during the four years ending with 1901 the number of steamships in the Japanese merchant service had increased from 627 to 942, the number of sailing ships from 174 to 3416, the tonnage of steamships from 429,774 to 557,166, and the tonnage of sailing ships from 24,014 to 315,576. In connection with these figures can be placed the fact that in 1896 Japan possessed only one merchant steamship of a tonnage exceeding 5000 tons, but now that country possesses 21 steamers whose individual tonnage is above 5000. The progress which has been made in the extension of its navigation interests by this country, which but recently won a place among civilized nations, is most surprising. At the same time it is a lesson worthy of study by a nation like the United States, so long in the forefront of enlightened nations of the world. We discuss ways and means for increasing our merchant marine service, and while we discuss the people of Japan push forward. This enterprising Asiatic nation has made great strides in securing a stronghold on the transportation interests of the Pacific Ocean. Japanese vessels are among the largest and best equipped in the Pacific service. Unless the people of the United States take more interest in this matter and adopt practical measures to secure and retain a hold on the commerce of the Pacific Ocean, Japanese steamers will in time control the greater part of that business.

CORRESPONDENCE.

Manufacture of Steel Castings from Baby Converters.

To the Editor: In your issue of May 22 I read the article on page 4, "Wednesday Evening Session of the American Institute of Mining Engineers," in reference to the manufacture of steel castings from baby converters, I was very much interested, but from actual experience I differ, although I have no doubt the gentlemen are honest in their convictions. I have had a few years' experience in making steel castings by different processes almost constantly since 1877—namely, McHaffee, open hearth, Robert, Tropenaz and at the present time Bookwalter, which I consider under proper conditions superior to any known process. A visit to our plant will convince the most skeptical. I am willing to make a broad assertion that with a small converter that will turn out about 5000 pounds of finished metal every half hour you can make any grade the open hearth people can, and also a great many that they cannot. For instance, after decarbonizing a 5000-pound heat, you can make two or three different kinds of steel out of the one melted bath. Following is the analysis of three different grades of steel made out of one heat: First ladle, 2000 pounds, 0.10 car.; mang. trace; sil., 0.01; second ladle, 2000 pounds, car., 0.25; mang., 0.60; sil., 0.25; third ladle, 2000 pounds, car., 0.55; mang., 0.85; sil., 0.28. The first of these the open hearth steel casting people cannot make at all, for they could not get it out of the ladle; however, they might a scull. I claim the small converter will produce hotter steel, with more life to it than the open hearth, and the claim is not "fallacious." You can decarbonize one 5000-pound heat, pour it into an open ladle, and hold the metal hot enough until you finish the second heat, then pour it into the same ladle and pour the entire mass into one mold over the lip of the ladle without any scull. You can take a small shank ladle with about 100 pounds of melted steel from the concerter, let two men carry it about 75 feet and pour it over the lip to the ladle the same as you would iron and have no scull. The open hearth people could not get it to run, even into a plain mold. We can run anything, from 1 ounce up. I predict in the near future that almost every steel casting plant will install a small converter for special grades of castings. Of course it requires constant attention and careful practice. I write this simply because the small converters have been ridiculed by different ones, when they did not understand or give them proper attention. SELDEN S. DEEMER.

READING, PA., May 26, 1902.

E. C. Headrick, who has had charge of the interests of the Westinghouse Electric & Mfg. Company in Le Havre, France, for the past two years, was a visitor in Pittsburgh last week. In speaking of electrical work in foreign countries Mr. Headrick said: "The French Westinghouse Company have had their plant in operation for the past five years, and the territory controlled from Le Havre includes Belgium, Italy and Spain. So great are the orders that it has become necessary to double the present size of the plant. In Le Havre we make the same line of work as at East Pittsburgh. Electrical work in Europe is as yet in its infancy. American goods are fast replacing those of home makes, and it is astonishing the number of Amreican stores that are being established in almost every city in Europe."

Lake Iron Ore Matters.

Ore Shipments.

DULUTH, MINN., May 31, 1902.—Estimates of lake shipments for the season to June 1 vary greatly, but it is evident that the Minnesota mines will make a total of about 1,800,000 tons, and if the rest of the region does what has been expected, the aggregate to the end of May is about 2,750,000 tons. There has been some delay from bad conditions at lower lake ports, where there are serious blockades, but at other points along the route there is no difficulty. These blockades seem to be the rule and will probably continue more or less all summer; that they will be damaging is not probable, for all the ore required is sure to go forward, unless some complications now unlooked for set in later. May reports of the Sault canals will be awaited with no little interest and are likely to be record breaking.

The Marquette Range.

Much interest is manifested just now in the western portions of the Marquette range, exicited by the taking of the Saginaw mine by the Donora Mining Company (Union Steel Company) and by other developments. The Saginaw lies 2 miles southwest of Ishpeming. It has been idle 20 years and more, but shipped before it was abandoned as a worked out property about 450,000 tons of good ore. The Fitch, just west of it, and the Goodrich, which lies between them, are both shortly to be reopened and explored. The territory lying west of these three old mines for about six miles, clear to the Humboldt and Foxdale and even to the Champion, still more to the northwest, will probably be the next to receive attention along this range. The ore bearing formation is strong and persistent through here, and there is much float and a sharp deflection of the needle. It is probable that some drill work may be done on the old Spurr mine, which is probably a continuation westward of the Michigamme, and perhaps on the old Portland. The Spurr has been idle since 1883, but mined before it was closed down 165,000 tons. Pickands, Mather & Co. have the option on the Portland and exploration work has commenced. It is possible that the Oliver Iron Mining Company may do work at Spurr. The Cleveland Cliffs Iron Company have an option on lands near the Princeton mine and will explore this summer. The Princeton is sinking a new shaft some distance south of that already in use. The Champion has increased its working force and the little village is very busy. At the various operating mines of the Marquette range ore is going forward very fast and stock piles are being rapidly reduced.

The Menominee Range.

On the Menominee range the most interesting development is the decision of the Chicago & Northwestern road to build another ore dock, which will be its fifth, at Escanaba. It is said that this dock is to be an immense affair, ranking well up to the enormous dock at the head of Lake Superior. Timber is already arriving in large quantity and the construction of the substructure and approaches will be undertaken at once. Exploration is in progress at the McGillis property, at Iron River, where some ore is shown. The Caspian shaft has reached the ledge and is encountering some ore of a fair grade. A three-compartment shaft has been sunk in a very short time and the property will ship this season. At the Hope the Oliver Iron Mining Company have commenced hoisting ore in small quantity.

The Vermillion Range.

On the Vermillion range, Pine Island, a few miles north of the Minnesota Iron Company's Soudan mines, has been taken under lease by Alfred Merritt of Duluth, who has great hopes of finding a valuable deposit of ore. The width between well defined walls is nearly 175 feet and Mr. Merritt has already found some handsome slaty ore. The outcroppings are traceable for more than half a mile. He will put in drills and explore the formation as thoroughly as possible, having a long lease at a low figure, 12½ cents a ton. Mr. Merritt was one of the original discoverers of the Mesaba range, and very many hope he will have rich success in his new venture. Considerable exploration is promised for the range this year, and by more new people than in a long time. Explorations on the Vermillion have been monopolized, because of their excessive cost, by two or three large steel making and mining interests, but a number of individuals expect to be at work there soon. There are ore bearing formations on the Vermillion that should reward the persistent explorer, but so far they have failed to do so, though fortunes have been spent.

The Mesaba Range.

By transfers filed at Duluth to-day it is announced that the haul of ore from the Agnew mine, the Hibbing property of the Deering Harvester Company, will be over the Eastern Minnesota road (J. J. Hill). The mine is now under initial development. A number of options have been taken of late on the sandy ores of the western Mesaba, in the vicinity of the Hawkins mine and beyond. The ores are good enough to partly make up for the silica found in them if it can be successfully washed, and the royalties are made at a price that will partly cover the cost of the washing processes. Much exploration will be carried on there in the season. The Colonial Mining Company, operators of the Hale and Kanawha, have commenced opening a new property on Kanawha ground. The output from this and the Hale will not be large. Joseph Sellwood has commenced work at the new Croxton mine, which lies northwest of the village of Buhl, in section 13—58—20, where a considerable body of ore has been shown. The Minnesota Iron Company have commenced shipping from the Ætna portion of the Mountain Iron deposit. A great deal of rock is being cleaned up out of the Mountain Iron pit this spring, immense ledges of taconite having been opened into and blasted down.

Canada.

The Wagner iron mine, lying 60 miles north of Sault Ste. Marie and owned by the Breitungs of Marquette, is to be a shipper soon, and will send its product to the furnaces at the Sault. D. E. W.

The Eight-Hour Bill in the Senate.

WASHINGTON, D. C., May 27, 1902.—The passage of the eight-hour bill by the House, and especially the summary manner in which the measure was rushed through, have served to concentrate attention on the Senate Committee on Education and Labor, to which the bill was referred on the 22d inst. It is generally accepted that conditions in the Senate Committee are quite different from those existing when the bill was before that committee in the Fifty-fifth Congress, or again in the Fifty-sixth Congress, and the most careful investigation of the situation fails to afford a reliable basis for a prediction as to the ultimate fate of the pending measure.

It can be stated positively that if this bill is favorably reported it will meet with very strenuous opposition in the Senate, and this fact is so well known here that it hardly seems likely that an attempt would be made to pass the measure before adjournment. Under the circumstances, however, it is of the highest importance that all manufacturers likely to be directly or indirectly affected by the provisions of the bill—and many would be indirectly affected to a very important extent who are not aware of that fact—should lose no time in acquainting their Senators with their objections to it. The friends of the measure are already actively at work in the hope of repeating in the Senate the extraordinary performance in the House, when this important bill was passed with less than ten minutes' consideration. W. L. C.

The Philadelphia Pneumatic Tool Company, Philadelphia, Pa., announce the removal of their offices to their new plant, at Twenty-first street and Allegheny avenue.

The Allis-Chalmers Company.

The first annual report of the Allis-Chalmers Company, who were incorporated in New Jersey on May 7, 1901, has been made public. It covers the operations of the company from the beginning of business up to April 30, 1902, and makes a favorable showing. Following is the official statement:

Net profits, after deducting all expenses of manufacture and selling, and after making full provision for depreciation of buildings, plant and machinery and for possible bad debts	$1,442,259.51
Deduct dividends declared on preferred stock	1,137,500.00
Balance, surplus carried to balance sheet	$304,759.51

The balance sheet as of April 30 shows:

Assets.

Real estate, good will, etc		$27,352,081.92
Bills and accounts receivable	$2,778,720.88	
Stocks of merchandise, materials and work in progress (at cost)	3,333,664.99	
Cash	4,514,167.05	
		10,626,552.92
Total		$37,978,634.84

Liabilities.

Capital stock:		
Preferred	$16,250,000.00	
Common	20,000,000.00	
		$36,250,000.00
Accounts payable	$1,139,500.33	
*Dividend No. 4	284,375.00	
		1,423,875.33
Surplus:		
Profits for period	$1,442,259.51	
Less dividends on preferred stock	1,137,500.00	
		304,759.51
Total		$37,978,634.84

* Paid May 1, 1902.

In his report President Charles Allis says: The manufacturing operations of the company during the past year have been marked by a demand for the products of the company greatly in excess of the capacity of the works even when operated under their most favorable conditions. The operations of the various works the past year have been greatly hampered and the output seriously restricted owing to the changes necessarily incidental to the consolidation of such large business interests, and to the prolonged strike of some of the workmen, the effects of which are still felt at several of the plants. Although the purchase of the several properties was made with their businesses as "going concerns" as of April 1, 1901, there were so many unfulfilled contracts of importance to complete and such changes in the methods of accounting, stock taking, cost keeping and general management to introduce that it was not until July 1 that the new organization was in full control of the officials representing the consolidated business.

In the latter part of May the International Association of Machinists called out from every shop of importance in the country all the union workmen, who responded by striking for higher wages, shorter hours, and the practical control of the works by a shop committee under the direction of the union. While this action was national in its extent, the demands were not the same in all sections. After the practical suspension of manufacturing at all the shops of the company for about two months the union workmen, without securing their demands, returned to work at all but the Chicago shops, where the output and its economical production are still somewhat impaired, although great progress has been made toward the re-establishment of the business of the company at this point on a proper basis.

The construction of the new works at West Allis, near Milwaukee, Wis., has been under the personal supervision of Edwin Reynolds, the company's chief engineer, and has so far progressed that a large increase of manufacturing capacity will be available during the current year. The works as now being built will more than double the present capacity of the Allis Works at Milwaukee and will be noteworthy in their character, extent and facilities. The first unit of machine and erection shops has recently been put in operation, and when these works are completed they will employ from 3000 to 4000 mechanics and will be the most modern as well as one of the largest engine plants in the world.

At the other plants of the company important additions of property and machinery have been made and are in course of construction and installation, with special reference to increase of output and decrease of cost of production.

Notwithstanding the above mentioned impediments to profitable operations, the net profits for the period ending April 30, 1902, after deducting liberal expenditures for maintaining and repairs, all corporation, general patent and other expenses, and providing ample reserves for depreciation, bad and doubtful debts and incomplete contracts, amounted to $1,442,259.51; deducting four quarterly dividends of 1¾ per cent. (7 per cent. per annum), paid on the preferred stock, $1,137,500, there remains as the net surplus at the commencement of the second fiscal year $304,759.51. The company have no floating debt. They have cash in bank amounting to $4,514,167.05, and in addition in excess of current liabilities they have net current quick assets of $4,688,510.54; total cash and net cash assets, $9,202,677.59. Orders unfinished and in hand April 30, 1902, $8,157,034.75; orders on hand and turned over to this company upon their commencement of business amounted to $5,665,882.13; gain in volume of business, $2,491,152.62. The amount of work available is much in excess of present facilities, and these will be gradually and largely increased during the present year as the new works at West Allis approach completion. We believe, therefore, the prospects of this company for the current year are most satisfactory.

Central Pennsylvania Industrial Notes.

HARRISBURG, PA., June 3, 1902.—Labor troubles and their results have been causing considerable annoyance to the iron and steel manufacturers in this part of the State. There are fears, which almost every one well informed believes to be groundless, that the soft coal miners will join the ranks of the striking anthracite mine workers, and then there are rumors that compromises are being effected with dissatisfied iron workers. The meeting held at Reading on Sunday was of interest, for it included men in several of the puddle mills east of Harrisburg, and may lead to the formation of Amalgamated lodges in some sections hitherto unorganized. It is unlikely that anything will be done here.

The strike has caused a number of manufacturers to notify buyers that there will be some delay in the completion of orders, and as a result much desirable work has had to be turned down. A number of the smaller concerns have worked up all of their stock and are waiting until the clouds roll by. The hard coal strike has not caused any difficulty except among furnaces and small establishments. None of them had laid in very much coal, and as a result what they had was soon exhausted.

The works in this city have not lost any time yet, and there are assurances that if soft coal can be secured there will be no suspensions. Almost every works here has been compelled to decline orders, because of uncertainty of material and time of delivery. Rail and plate orders are hard to place. Lebanon, Reading, Lancaster, Columbia and other places have had trouble from strikes, but York, Pottstown, Williamsport and points in the Juniata and Upper Susquehanna valleys have escaped, and are busy.

President J. H. Sternbergh of the American Iron & Steel Mfg. Company, stated at Reading that his attitude toward the men who had struck in the company's works would not be affected by movements of any other company or by any labor organizations.

The Pennsylvania Steel Company will likely occupy their new frog and bridge shops this summer. They have been under construction for two years and will be among the most complete in the country. The removal of machinery to them will be commenced in July.

Affairs are flourishing in Waynesboro, and the manufacturing companies report increased forces of men and many orders, some of them for export. The Geiser, Emmert and Smith companies will have a very busy summer season. Another Cumberland Valley concern who

are busy are the Chambersburg Engineering Company, whose plant is to be enlarged this summer.

The idle mill of the Sunbury Nail & Iron Company at Sunbury was burned on Thursday night. It had not been operated for some time, but only lately there had been some talk of starting up the plant. The loss was $35,000.

Ground has been broken by the Central Iron & Steel Company for the new open hearth steel plant, mentioned some time ago in these columns. It will be located near the company's Paxton furnaces.

The Drop Forge Works, soon to remove to Chester, have let a contract for a plant to cost $50,000 to J. & T. Oliver of Chester. The plant is to be built as soon as possible on Central avenue.

R. C. Neal of this city, who recently bought the Hollidaysburg Iron Works, is operating them on skelp and bar iron. s.

The Drawback on Lead Ore.

Statement by the Selby Smelting & Lead Company.

WASHINGTON, D. C., June 3, 1902.—Manufacturers in all parts of the country are manifesting a lively interest in the fate of the Lovering bill for the amendment of the drawback laws, and many communications have reached the Ways and Means Committee approving the proposed change and pointing out the particulars in which various industries would be aided by the abolition of the necessity of identifying foreign materials in goods manufactured for export. The somewhat conflicting testimony of the Government experts with regard to the extent to which industrial conditions can be met under the present law and regulations makes it important that the facts concerning each industry should be laid before the House Committee, and this is now being done by prominent firms in many lines of trade. The chief difficulties which are now encountered by manufacturers of metals of all kinds are succinctly set forth in a communication which the committee has received from the Selby Smelting & Lead Company of San Francisco, which is so comprehensive in its scope as to serve as an illustration of conditions prevailing in other lines. This communication is in part as follows:

This company are engaged in the smelting of gold, silver and lead ores, the refining of the resulting lead bullion, producing therefrom pig lead and the manufacturing from pig lead of large quantities of shot, pipe, sheet, &c. They also mechanically load shot in cartridges. The company favor the proposed bill because the bill removes from the present law regulations which are in restraint of trade. The present law requires the use of the identical pig lead withdrawn from the bonded warehouse for manufacture in order to secure the benefit of a drawback; or, if mixed with domestic lead, that the proportions of domestic and foreign shall be determined accurately.

The Manufacture of Shot.

The amount of foreign lead can only be determined definitely through the complete cleansing of shot wells and lead kettles, or by the use of separate wells and kettles. The use of separate shot wells is impracticable, as such wells are sunk in the earth. The use of separate kettles adds to the cost of a plant.

The economical manufacture of shot calls for a continuous day's run on one size, though limited quantities of approximating sizes will be dropped at the same time. Owing to the present limited export trade in shot from the Pacific Coast, the individual orders are generally for quantities less than the equivalent of a day's run and are divided into many sizes. The difference in sizes involves frequent changes of the shot pans or sieves through which the molten lead is dropped (the size of the holes in which determines the size of the shot), and naturally materially increases the cost of making the shot. The irregularity of the orders and the varying sizes required and also the different standards of sizes used in countries bordering on the Pacific Coast, and the varying weight of packages, forbid the manufacture of shot in large quantities in advance of foreign orders. This company have found that the necessity of making shot in the manner indicated above adds about $2.50 per ton to the ordinary cost of manufacture. The method outlined above must be rigorously followed in order to insure strict compliance with the law.

The competition in foreign trade is so keen that, handicapped as the company are by the present drawback law, there is practically no profit on exported goods. The only benefit accruing to the export trade is the fact that the goods made to meet that demand assist in keeping the plant continuously occupied.

The proposed bill does away with the identification and permits the substitution of domestic for foreign lead. If this bill becomes a law, it will enable the manufacturer to ship out of stock already manufactured and which has been manufactured in the most economical manner.

The substitution of domestic lead, in whole or in part, for foreign lead cannot work to the disadvantage of the Government on account of any difference in value of lead from time to time, as the import duty on lead is specific and not ad valorem, being 1½ cents per pound on lead contained in foreign ores and 2⅛ cents per pound on foreign lead bullion and foreign pig lead. It is a simple matter of weight in the case of lead, as only 90 per cent. of the ascertained weight of lead in foreign ores or bullion can be exported or manufactured. As there is no difference in the quality of lead produced by a smelter, whether from domestic or foreign ores, the substitution of one for the other can make no difference to any individual or to the Government.

Antimonial or Hard Lead.

I would also call your attention to a smelter product which is denied the benefit of drawback by the present law and of which no notice is taken in the proposed bill. This product is the so-called antimonial or hard lead. In most lead ores, foreign or domestic, more or less antimony is present, but usually in such small proportion to lead as to cause the Government in assaying foreign ores to include the weight of the antimony with the lead and report it as lead. This method of procedure increases the weight of the lead to the extent of the antimony present, and the Government charges the lead duty on the increased weight. (The duty on lead is greater than on antimony.) The Government follows this method for the reason that in the processes of assaying the antimony united with the lead and the resulting mixture would have to be specially treated in order to find the exact percentage of antimony.

This percentage of antimony is so small in the case of such foreign lead ores as are treated by smelters as to make the determination of the antimony of no moment to the smelter, especially as the duty on lead ores is not much higher than the duty on antimony. As the Government collects the lead duty on the insignificent weight of antimony it has no incentive to take the apparently unnecessary trouble of ascertaining the quantity of antimony contained in the ore with the lead. In smelting, the antimony present in the foreign and domestic ores smelted together unites with a weight of lead varying from two to five times the weight of the antimony and forms a mixture which cannot be economically separated. In one of the processes this mixture is eliminated from the balance (this balance being a larger quantity of lead not mixed with antimony), and is reduced to a metallic hard lead, which is sold cheaply and is the basis of a large portion of the antifriction metals, type and stereotpye metals used in this country.

While the present drawback law permits the manufacture of mixed metals from foreign lead and foreign or domestic antimony and drawbacks on such mixed metals exported, it does not allow the natural smelter hard lead to be set aside and used for bonded purposes, but requires such setting aside to be done from refined pig lead.

If this smelter hard lead, a natural product of the smelter, could be set aside for bonded purposes, it would give antifriction type and stereotype metal manufacturers a very cheap metal, and thus enable them to materially enlarge their export business. This smelter hard lead could be given the benefit of the present drawback

law by so amending it as to permit a weight of this hard lead to be set aside as bonded whose ascertained lead contents would equal the weight of lead permissible in such case; and this amended provision of the present law could be retained in any new law which might permit substitution instead of requiring identification.

W. L. C.

American Foundrymen's Association.

Secretary Richard Moldenke, New York, has prepared the following provisional programme of the coming convention to be held in Boston June 17 to 19:

Tuesday Morning 10 O'Clock:

Addresses of welcome and response, secretary's report, treasurer's report, auditor's report.

Report of Committee on the Standardizing Bureau.

Report of Committee on Standard Methods of Determining the Constituents of Cast Iron.

Report of the Committee on Standard Sampling of Pig Iron.

Report of the Committee on the Grading of Pig Iron by Analysis.

Report of the Committee on a Foundry Trade School.

Presentation of the "Standard Specifications for Steel Castings as Adopted by the American Association for Testing Materials."

Presentation of a "Memorial on the Insuring of Patterns," by Frederick Conlin of South Bethlehem, Pa.

Presentation of a "Memorial on the Proper Valuation of Pig Iron for Foundry Purposes," by Dr. Richard Moldenke, New York.

Tuesday Afternoon:

This day being a holiday in the city of Boston, an invitation by the city to witness the military and civic parade has been extended to us. Furthermore, arrangements have been made to attend the great ball game of that day for those who prefer it. In case of rain—a business session.

Tuesday Evening:

Theater party.

Wednesday Morning:

From 9 to 10 an opportunity will be given our members, through the courtesy of the authorities of the Massachusetts Institute of Technology, to study their very complete engineering laboratory, where tests on various materials will be in progress at the time.

Business session to begin at 10 o'clock.

"Some Methods of Increasing Foundry Production," by David Reid, Biddeford, Maine.

"Shop Conditions," by Hugh McPhee, Bridgeport, Conn.

"Foundry Costs," by R. P. Cunningham, Holyoke, Mass.

"Cores and Core Arbors," by Edw. B. Gilmour, Milwaukee, Wis.

"Shop Tools and Rigs," by Jas. A. Murphy, Erie, Pa.

"Technical Education," by Prof. R. H. Richards, Boston, Mass.

"The Molding Machine—Jigs," by S. H. Stupakoff, Pittsburgh, Pa.

"The Effect of Melting Steel with Iron in the Cupola," by H. E. Diller, Chicago, Ill.

A lecture by Dr. Fay on the preparation of metallographic specimens for the foundry.

Wednesday Afternoon:

Carriage drive through the Metropolitan park system, visiting the plant of the Walker & Pratt Mfg. Company, Watertown, where lunch will be served, after which drives will be continued through Cambridge and Harvard College grounds back to hotel.

Wednesday Evening:

Vaudeville and smoker. Special entertainment for the ladies.

Thursday Morning and Afternoon:

Boat trip around Boston harbor, with dinner at Nantasket Beach and a visit to the plant of the Fore River Ship & Engine Company, if arrangements can be made to get there by boat.

Thursday Evening:

Business session. Ladies will be specially entertained.

"The Metallurgy of the Cupola," by Herbert E. Field, Ansonia, Conn.

"Economy," by P. R. Ramp, Schenectady, N. Y.

"Foundry Accounting," by James G. Stewart, North Ormesby, England.

"The Molding Machine—Flasks," by S. H. Stupakoff, Pittsburgh, Pa.

"Brass Melting," by Chas. Vickers, Chicago, Ill.

"Cast Iron," by Percy Longmuir, Manchester, England.

A lecture by Albert Sauveur on the application of metallography in foundry work, illustrated by projections from the actual specimens of cast iron.

Unfinished business, new business, election of officers, adjournment.

MANUFACTURING.

Iron and Steel.

It is reported that the National Rolled Steel Car Company will build a plant near New Castle, Pa. It is also stated that a large bridge concern will erect a new works near New Castle.

The Burns Uniform Steel & Metallic Company of Pittsburgh, recently incorporated, will let contracts for the construction of the crucible department of their plant to be built at Latrobe, Pa. The company have secured 40 acres of ground near Latrobe, 20 acres of which are being prepared for the plant, to consist of an open hearth department with four furnaces from 25 to 50 tons capacity, a rolling mill and a series of buildings for the crucible department, to contain four 48-pot ranges. Both the crucible and open hearth furnaces will be constructed differently from any now in use, being designed by James Burns, who controls the process which will be employed in the manufacture of uniform steel. Different grades of steel will be produced in the crucible department, to be used for tools, stay bolts, locomotive work, fine sheets, boiler plates, roofing, &c. It is the intention to get the crucible department in operation before letting contracts for the construction of the open hearth and rolling mill departments. The headquarters of the company are in the Lewis Block.

When the improvements now being made to West Duluth Furnace by the Zenith Furnace Company of Duluth, Minn., are completed, the capacity of the stack will be increased to 225 tons of pig iron per day. She is expected to blow in about July 1.

The American Sheet Steel Company are dismantling their Russia mill at Niles, Ohio, which consists of two sheet mills, one muck train and 23 puddling furnaces. The plant has never been operated since the organization of the American Sheet Steel Company. The Falcon mills of the American Sheet Steel Company, also at Niles, have been closed down for the present.

Plans are being prepared by S. Diescher & Son, consulting engineers, Hamilton Building, Pittsburgh, for the new plant of the Franklin Rolling Mill & Foundry Company, Franklin, Pa., which will manufacture special shapes of steel telegraph poles and malleable steel castings.

Mackintosh, Hemphill & Co. of Pittsburgh have received an order for a 32-inch blooming mill for the new steel plant to be built by the Deering Harvesting Company, at South Chicago, Ill.

The Janson Steel & Iron Company, Oxford, N. J., will build three double puddling furnaces in addition to 16 furnaces they now have.

The shareholders of the Buffalo Iron Company of Nashville, Tenn., on May 6 approved the proposition to consolidate with the Bon Air Coal Company, under title of the Bon Air Coal & Iron Company. The Buffalo Iron Company own three iron furnaces and 80,000 acres of mineral lands in Wayne, Lewis and Hickman counties, Tenn. They have outstanding $700,000 common stock and $350,000 preferred stock in $100 shares; also $270,000 of 5 per cent. bonds due in 1925. Some time ago Edgar Jones, representing a syndicate, offered par for the bonds and the preferred stock and 50 for the common stock. The Bon Air Coal Company have outstanding $500,000 each of common and preferred stock and $157,000 6 per cent. bonds due in 1928.

The Worth Brothers Company of Coatesville, Pa., contemplate extensive additions to their works aside from their proposed new plate mill, plans for which are not yet fully developed. They are laying out a new plant on the opposite side of the Philadelphia & Reading Railroad from their present works, the arrangement of which will be such as to admit of quite a number of open hearth furnaces in addition to the four modern 50-ton furnaces now in course of erection, the contract for which has been awarded the S. R. Smythe Company of Pittsburgh. The McClintic-Marshall Construction Company of Pottstown have the contract for the building. The demand for plates and boiler heads has been somewhat beyond their capacity of late, but after their new mill is completed they expect to be

able to furnish all sizes that may be required and plates as large as the transportation people can handle.

Victor Beutner, consulting engineer, Westinghouse Building, Pittsburgh, is preparing plans for a large open hearth steel plant to be built at Canton, Ohio, by a number of parties interested in the Berger Mfg. Company and the Carnahan Tin Plate Company. The plant will consist of three 35-ton furnaces, with a 32-inch universal mill. The open hearth building will be 96 x 280 feet and the rolling mill building 60 x 360 feet, both built of structural steel. There will also be a producer house, boiler and engine room, &c. The universal mill has been secured, it being the one formerly in use at the Graff, Bennett plant, at Millvale, Pittsburgh. It will be thoroughly remodeled and put in the best of shape. The works will be so arranged that they can be duplicated at any time.

The rod mill of the Sharon Steel Company, at Sharon, Pa., was considerably damaged by fire last week and will probably be idle for some time while repairs are being made.

Mabel Furnace, of Perkins & Co., Limited, at Sharpsville, Pa., was blown out last week for relining and repairs.

W. D. McKeefrey, trustee of the Continental Iron Company, at Wheatland, Pa., has been granted permission by the courts to operate that plant for one year from July 1, 1902.

The report is incorrect that an order has been issued from the New York office of the United States Steel Corporation to the effect that the mills of the W. De Wees Wood Works, of the American Sheet Steel Company, at McKeesport, Pa., would not be started up until Monday morning at 4 o'clock instead of Sunday evenings, the practice heretofore. No such order has been issued, nor has there been any change made in the time of starting up this plant.

The Atlanta Rolling Mill & Tin Plate Company of Atlanta, Ind., have been incorporated with a capital stock of $250,000 and organized by the election of the following directors: Henry Rhoades, L. C. McFatridge and J. M. Whisler of Atlanta; William Marker of Tipton, Henderson Coppock of Ekin, H. B. Hibben of Indianapolis, and J. A. Mitchell of Noblesville. J. M. Whisler has been elected president, Henry Rhoades vice-president, J. C. Kessler secretary, Edwin Walton treasurer and Walter Jones manager.

The Elwood Steel Company of Indianapolis, Ind., have been incorporated with a capital of $10,000 for the manufacture of steel ingots, billets, metal sheets, bars and forgings. The directors are Thomas Wright, William J. Alford, Herbert Ames, Oliver Ames and Oliver W. Mink.

General Machinery.

John A. Waters & Co., Richmond, Va., dealers in engines, boilers and general machinery, have purchased a building and lot at Manchester, across the James River. The building will be enlarged and will be equipped with the machinery now in the Richmond plant for machinery repairs and for the manufacture of asbestos pipe covering and other asbestos goods. The present building will be used as a warehouse and general offices.

The Cincinnati Screw & Tap Company, Cincinnati, Ohio, are exceedingly busy, mostly on special work. They have added several new machines at the rate of three in number per month for the past five months, and expect to continue at this rate for the balance of the year. They have also made considerable additions in the way of new machinery in their tool room and finishing departments. The company are desirous of obtaining catalogues of manufacturers of screw, bolt and nut manufacturing machinery of latest improved type.

The Hubard Machine Works, Lynchburg, Va., founders and machinists, are preparing to manufacture a line of pulleys and hangers, which they expect to put on the market in the fall. They report a substantial increase in business for the past year over the previous one.

Considerable new machinery will be required by the Abrasive Material Company of Paschall, Philadelphia, who have just given out the contract for the erection of an addition, 60 x 100 feet, and alterations to their plant.

The recent damage by fire to the machine shops of Davidson & Sorenson, Casselton, N. D., was only slight, and the firm are inconvenienced in no way.

The Woodward Governor Company, Rockford, Ill., manufacurers of friction water wheel governors, will incorporate for the purpose of extending their business.

The Bausch Machine Tool Company, Springfield, Mass., have increased their capital stock to $110,000.

The Sovereign Foundry & Mfg. Company, Lebanon, N. J., have been incorporated, with a capital stock of $125,000, for the purpose of taking over the foundry of the Eagle Foundry Company and the machine shops of H. M. Sovereign, both built about two years ago. The new company will continue the manufacture of turbine water wheels, mill gearing, grain threshers and special machinery. The incorporators are Henry M. Sovereign and Edwin J. Sovereign of Lebanon, and George E. Sovereign of Pottersville, N. J.

The Hope Ventilating Company, Kansas City, Mo., manufacturers of cone ventilating fans, steel plate blowers and exhausters and hot blast heating apparatus, have been incorporated under the name of the Hope Blower Company for the purpose of increasing their facilities and the addition of new lines of manufacture.

The P. & K. Iron Works of Pierre, S. D., have been organized with a capital of $50,000. The incorporators are: C. K. March, F. W. Parsons and H. J. Keliam.

The Fairbanks Machine Tool Company of Springfield, Ohio, formerly operated by the Springfield Foundry Company, have been incorporated with a capital stock of $160,000, and have absorbed the business of the Springfield Foundry Company and the United States Tool Holder Company, who have heretofore been operating independently. The new company have very complete works, and will continue the manufacture of gray iron castings, Fairbanks lathes and a complete line of tool holder appliances. The officers are M. L. Milligan, president and general manager; N. H. Fairbanks, vice-president and treasurer, and Pearl Young, secretary, who, with E. C. Price, Oscar T. Martin, W. H. Sieverling and Joseph Normand, constitute the Board of Directors.

The Braddock Machine & Mfg. Company, Braddock, Pa., manufacturers of rolls and rolling mill machinery, will install two additional cupolas with a capacity of 25 tons daily.

The Youngstown Foundry & Machine Company, Youngstown, Ohio, builders of rolls and rolling mill machinery of all kinds, have been awarded a contract for conveyor tables and other equipment, to be installed in the Sylvan Works of the Republic Iron & Steel Company, at Moline, Ill.

Jones & Laughlins, Limited, of Pittsburgh, have been given a contract for a large lot of pulleys, hangers and shafting for the Sylvan Works of the Republic Iron & Steel Company, at Moline, Ill.

The McKee's Rocks Foundry & Mfg. Company, recently organized at Pittsburgh, have completed the building of their works, and will manufacture a patented hoisting jack.

The Illinois Central Railroad Company, Chicago, Ill., will erect extensive machine shops at Memphis, Tenn.

The Williams Tool Company, Erie, Pa., organized a short time ago for the manufacture of pipe threading and bolt cutting machinery, special tools, &c., have just completed a one-story brick structure, 80 x 135 feet. The equipment is now being installed, and it is expected to begin operations some time in the latter part of June. The officers are: R. T. McClure, president; John Jordon, Jr., vice-president; John A. Lang, secretary and treasurer, and J. C. Williams, manager.

The American Tool Works Company of Cincinnati, Ohio, manufacturers of a large line of metal working machinery, including engine lathes, planers, shapers, upright drills, radial drills, screw machines, brass working machinery, &c., in order to better serve their increasing trade in St. Louis and vicinity, are now opening up a new store and office in the heart of the machinery district of St. Louis, 720 North Second street, at which address a representative stock of their machines will be on exhibition. A. B. Bowman, who has been identified with machinery business in St. Louis for a great many years, will be the agent at that office.

Some grinding and polishing machinery and equipment for forge room are required by William Dobson of Canastota, N. Y., manufacturer of molders' tools, bellows and supplies, for his new plant, the erection of which will be commenced shortly. The building will be 30 x 40 feet, two stories, and a one-story forging room 20 x 30 feet.

The Lindsay & Addison Company of Los Angeles and the Pomona Foundry & Machine Works of Pomona, Cal., have consolidated under the name of the Lindsay & Addison Foundry & Machine Works. The new company will occupy the plant of the Pomona Company, removing the machinery from Los Angeles. They will manufacture the Addison deep well double plunger pump, the Wright oiling machine and will do general foundry and machine work.

The Owen Machine Tool Company, Springfield, Ohio, who were burned out in the East street shop fire early in February, since which time they have been occupying temporary quarters, have reorganized with a capital stock of $100,000 and have secured a site upon which they will erect a new plant, 70 x 250 feet.

The Ohio Cultivator Company of Bellevue, Ohio, will erect a steel forge and blacksmith shop, 200 x 65 feet.

The Cleveland, Cincinnati, Chicago & St. Louis Railway Company have completed plans for the erection of large repair shops at Springfield, Ohio. A site of 17 acres has been purchased and the new plant will include a round house, machine shop, blacksmith shop, planing mill and tank and boiler shop. It is stated that the company will make $750,000 worth of improvements at Springfield during the next three years.

Boilers, Engines, &c.

Crow & Bechtel of Goshen, Ind., have begun the manufacture of gasoline engines, and Ihrig Brothers are also starting in the same line.

The Pittsburgh, McKeesport & Connellsville Street Railway Company have placed contracts with the Westinghouse Electric & Mfg. Company and the Westinghouse Machine Company, both of Pittsburgh, for equipment which will double the power plant of the interurban traction system. Orders placed with the Westinghouse interests are for three 1500 horse-power Parsons steam turbines and three 1000-kw. Westinghouse generators.

The Allis-Chalmers Company have placed an order with the Pittsburgh Gage & Supply Company, Pittsburgh, Pa., for a complete White Star filtering system to be applied to two of their engines destined for improvements in the plant of Jones & Laughlins, Limited, Pittsburgh, Pa.

The Fairbanks Morse Mfg. Company, Beloit, Wis., contemplate the manufacture of steam pumps. Four new buildings are to be constructed, including a foundry 132 x 92 feet, in which molding machines will be used exclusively. The pump manufacturing building will be 300 x 90 feet; warehouse 150 x 80 feet; a power house will also be erected. The main line of manufacture will be underwriters' pumps, such as have been approved by the American Board of Underwriters.

James E. McNary, Empire Building, Pittsburgh, has taken the contract to furnish the Carnegie Sheet Steel Company of Carnegie, Pa., with three Hamilton-Corliss engines made by the Hooven, Owens & Rentschler Company of Hamilton, Ohio. Mr. McNary has also accepted the sales agency of the Burt Mfg. Company of Akron, Ohio, for the sale of the Burt oil filter and the Burt exhaust heads.

As soon as the plans are perfected considerable new equipment will be required by the recently organized Mill River Electric Light Company of Williamsburg, Mass., who will erect a power plant, using sawdust, shavings and slabs from the saw mill of G. M. Bradford as fuel. Henry W. Hill is treasurer.

It is probable that a company will be organized at Springfield, Ohio, with a capital stock of $50,000 to manufacture gas, gasoline and kerosene engines, the invention of William Shawd of the Shawd Machine Works of that city. The new company will erect a plant, the promoters having several sites under consideration.

The Southern Engine & Boiler Works, Jackson, Tenn., have increased their capital stock from $75,000 to $200,000. The company now have in course of erection additions to their plant which, when completed, will give them about three times the capacity they have at present.

Engine and boiler of about 100 horse-power capacity, a dynamo, &c., will be required by the Floral Park Light & Power Company of Floral Park, N. Y., for their proposed new power plant. The company were recently incorporated with a capital stock of $50,000. John F. Klein is general manager.

Foundries.

The Wilks Foundry Company, Toledo, Ohio, who have just put their new plant into operation, are making castings up to 40 tons and have a daily capacity of 100 tons.

The business of E. R. Allen, Corning, N. Y., manufacturer of gray iron castings and special agricultural implements, has been incorporated under the name of the E. R. Allen Foundry Company, with a capital stock of $40,000. It is the intention of the company to install some new machinery and to enlarge the present plant, which consists of a foundry 60 x 80 feet, cleaning and boiler room 20 x 80 feet, machine shop 36 x 80 feet, two-story cupola room 20 x 22 feet, office building, &c. The directors are E. R. Allen, C. W. Allen, L. L. Flower, M. H. Fralic and H. E. Metcalf.

The Art Stove Company, Detroit, Mich., are building a new foundry, 182 x 184 feet, and a new engine and boiler house, 40 x 80 feet, in which will be installed two new boilers and a 500 horse-power engine, trebling the present power capacity.

The Lorenna Foundry Company, Bridgeport, Pa., recently organized, have leased the William Swan & Son foundry and will manufacture gray iron and brass castings. The officers are Joseph C. Laird, president, and A. Wilkinson, treasurer.

Fires.

Brunk & Heyer's machine shop, at Lorain, Ohio, was last week destroyed by fire. The loss is about $10,000.

The plant of the Weir Pottery Company, Monmouth, Ill., was destroyed by fire May 29, entailing a loss of about $90,000.

The Sunbury Iron Works, Sunbury, Pa., were destroyed by fire May 30, entailing a loss of about $50,000. The plant has been idle for some time.

The Nichols & Shepard Thresher Company, Battle Creek, Mich., suffered a $100,000 loss by fire at their plant May 27.

The H. C. Tack Company, Cleveland, Ohio, suffered a $2000 loss by fire at their plant May 29.

A. J. Sackett's machine shop, at Canton, Md., was destroyed by fire recently. The loss is about $5000.

The plant of the Robinson Mfg. Company, at Monongahela City, Pa., was completely destroyed by fire last week. The company manufactured mine and coal haulage machinery. It is probable the works will be rebuilt on a larger scale.

The Johns-Pratt Company, Hartford, Conn., manufacturers of asbestos, suffered a $50,000 loss by fire at their plant June 3.

Bridges and Buildings.

The Somerville Engineering Company have been organized at Pittsburgh and will supervise all kinds of work under construction, examine plans and designs of intended structures and design bridge and all kinds of structural work. A. T. B. Somerville, formerly in charge of the designing and estimating department of the American Bridge Company, at Pittsburgh, is connected with the new company, while A. L. Schultz, former Pittsburgh manager of the American Bridge Company, is consulting engineer.

Hardware.

Central Barb Wire Fence Mfg. Company of Pekin, Ill., have been organized with a capital of $5000 to manufacture barb wire fencing. The incorporators are Francis C. Carroll, Otto Koch and Thomas Cooper.

The Fox Cutlery Company, Dubuque, Iowa, manufacturers of the Fox razor, advise us that their business continues to show a steady growth. They are in receipt of numerous testimonials in which the efficiency of the razor is referred to.

Climax Tag Company, Dayton, Ohio, manufacturers of cotter pins and flat spring keys, will shortly be installed in a three-story brick structure at 17 N. Krower street, which they are now fitting up with the latest improved machinery, which will virtually double their former output. The company report an excellent demand for their product.

The Tryon Mfg. Company, Hartford, Conn., manufacturers of Hercules Nonslip belting and Hercules Nonslip belt renovator, have moved to a factory on Barber street, to which an addition has been built. At present steam power is used, but later, it is expected, electric power will be installed.

Decatur Cornice & Roofing Company, New Decatur, Ala., expect within the next few months to take possession of their new factory, the capacity of which, they advise us, will be six times that of the plant now occupied. The company state that they are unusually busy for this season of the year, and the prospects for the remainder of 1902 are most encouraging.

The Snell Cycle Fittings Company, Toledo, Ohio, report their bicycle business in a very healthy condition. On their side lines, such as general machine work and a general line of drop forgings, business has also been very good. They are doing a good deal of work for the various automobile makers.

American Crayon Company, Sandusky, Ohio, are erecting a new plant, of which they expect to take possession about July 1. The plant consists of the following buildings: Office building, 42 feet square, two stories and basement; crayon factory building, 258 x 110 feet, two stories and basement; box factory, 92 x 249 feet, one story and basement; box storage building, 42 x 123 feet; lumber storage building, 42 x 122 feet; veneering building, 50 x 70 feet; main warehouse, 58 x 254 feet; power house, 80 x 90 feet. The power house will be equipped with three 125 horse-power boilers and one of 100 horse-power, also one Allison-Corliss 400 horse-power engine, and one 500 horse-power electrical generator which will supply power for the entire plant in all departments. The buildings are equipped with the Buffalo Forge Company's fans and heaters for heating and ventilating by the hot air system, also with heaters and fans for the drying of the crayon. The several lumber working buildings will be equipped with exhaust fans for each machine, which will suck out all sawdust, shavings, blocks and chips, and deliver them into the engine room for consumption in the furnaces. All the buildings will be constructed of stone and brick, with heavy timber construction inside, and efforts are being made to make it a model factory in every respect. When the buildings are in full operation it is expected that more than 250 hands will be employed.

Up-to-date Mfg. Company, Terre Haute, Ind., manufacturers of fencing, all steel lawn swings, bank and office railing, window guards, &c., are making arrangements to double their present capacity. They are now running their plant night and day, and are still behind orders.

Miscellaneous.

The Pittsburgh & Lake Erie Railroad, at Pittsburgh, is receiving 1000 box cars from the American Car & Foundry Company. Half of the number are being made at Jefferson Works, at Jefferson, Ind., and the remainder at Detroit Works, at Detroit, Mich.

The annual meeting of the Lake Angeline Dock Company, a subsidiary corporation of Jones & Laughlins, Limited, was held in Pittsburgh last week. The company own and operate iron ore docks in the Lake Superior regions near the ore mines of Jones & Laughlins, Limited. The directors elected were the same as last year and included James Laughlin, Jr., B. F. Jones, W. W. Willock, H. A. Laughlin, B. F. Jones, Jr., G. M. Laughlin and James B. Laughlin. The officers are: James Laughlin, Jr., president; W. W. Willock, vice-president; John L. Moore, secretary-treasurer; W. G. Pollock, general manager; James Laughlin, Jr., B. F. Jones and George M. Laughlin, Executive Committee.

Press dispatches announce that the assets of the Canda Can Company will be offered for sale on June 2.

The Ashland Land Company of Rhinelander, Wis., have been reorganized with a capital of $15,000. N. A. Coleman, C. Francis Colman, and J. A. Walsh are the incorporators.

The Columbia Can Company, St. Louis, Mo., recently incorporated, will erect a large plant at 501 North street, which will be equipped with the latest improved machinery. The officers are Herman F. Westerbeck, president; Fred. L. Westerbeck, Jr., vice-president; Emil J. Westerbeck, secretary and treasurer, and Charles Doermann, manager.

The Reading Stove Works, Reading, Pa., have decided to increase their capital stock from $400,000 to $600,000 for the purpose of extending the plant and improving the financial policy.

The Whiteside Wheel Company, Limited, Michigan Trust Building, Grand Rapids, Mich., have incorporated for the manufacture of patented metal vehicle wheels. They have several sites and old plants under consideration, but have not yet decided whether they will take up an existing plant or build a new one. Sidney B. Whiteside is chairman.

Crucible Steel Company of America.

PITTSBURGH, PA., June 4, 1902.— (*By Telegraph.*)—A reorganization among officials of the Crucible Steel Company of America of Pittsburgh has been made, C. H. Halcomb having retired as president and also as a member of the Executive Committee. The following new officials have been elected: Reuben Miller, president; Frank B. Smith, assistant president and general manager; Benjamin Atha, first vice-president; Robert E. Jennings, second vice-president; James H. Park, third vice-president, and Charles E. Clapp, fourth vice-president. No secretary has yet been elected, but H. N. Babcock has been made assistant secretary; Julius Bieler, treasurer, and John Neeley, assistant treasurer.

A new Executive Committee has been elected, consisting of R. Miller, C. H. Halcomb, resigned, A. W. Mellon, Frank B. Smith, Benjamin Atha, Robert E. Jennings and Jas. H. Park. Reuben Miller, who has been made president of the Crucible Steel Company, is very highly regarded among the business and banking interests of Pittsburgh, and his selection as head of the company is a merited recognition of his executive and financial ability.

Pittsburgh Reduction Company.—A bulletin just issued by the Geological Survey at Washington, D. C., contains the following paragraph concerning aluminum: The production of aluminum in the United States during 1901 amounted to 7,150,000 pounds. The Pittsburgh Reduction Company, operating the Hall patents, remain still the sole producer of aluminum in this country. The price of aluminum a pound remained practically stationary throughout the year, although the demand for the metal increased. The total imports of all forms of aluminum in 1901 were valued at $109,748, as compared with $50,444 in 1900.

Jones & Laughlin Steel Company of Pittsburgh have received their charter, and will take over July 1 all the interests of Jones & Laughlins, Limited, owning the American Iron & Steel Works, Eliza furnaces, Monongahela Connecting Railroad and other subsidiary interests at Pittsburgh. The capitalization of the Jones & Laughlin Steel Company has not been made public, but will not be $50,000,000 as was reported. The capitalization will be less than that figure.

The annual convention of the Chain Workers' Union of North America is being held this week at Braddock, near Pittsburgh. Among the more important measures to come before the convention will be the adoption of a wage scale for the coming year and also the consideration of the best means to be adopted for the settling of wage disputes.

R. S. Payne, contracting engineer, Equitable Building, Baltimore, Md., is desirous of receiving catalogues, price-lists, quotations, &c., from manufacturers of gasoline engines and pumps, particularly engines of from 1 to 10 horse-power, with the view of handling the most suitable types in the South. Mr. Payne was formerly assistant to the chief engineer and southern division manager of the American Car Company.

The Columbia Steel Company, a branch of the Automobile & Cycle Parts Company, who have been operating a plant at South Chicago, have acquired a site at Elyria, Ohio, between the Cleveland, Lorain & Wheeling and Lake Shore tracks, upon which they will erect a plant for the manufacture of cold rolled steel strips and cold drawn rods. The main building will be 80 x 400 feet. A hot roll mill will probably be added later. The directors are M. B. Johnson of Cleveland; A. L. Garford and George H. Ely of Elyria; Col. A. Pope of Boston, and R. M. Coleman of New York City.

OBITUARY.

ANDREW WALLACE, for many years manager of the interests of John H. Bass, at Chicago, and one of the best known members of the Western iron trade, died at his residence in that city on May 26. Some years since the car wheel business and engine building department of Mr. Bass were incorporated under the name of the Fort Wayne Foundry & Machine Company, but Mr. Wallace was continued in charge of the Chicago works after the reorganization, holding his position until his death. Mr. Wallace was a native of Scotland, had reached the age of 77, and was one of the oldest members of St. Andrew's Society. He is survived by a widow and four children.

GORDON H. GILE, one of the pioneer iron mine men of Wisconsin, died on May 12, at his home in Oshkosh, from heart failure. Mr. Gile had been in poor health for some years, but was actually engaged in business up to the time of his death. He was born in Oxford, N. Y., 74 years ago, and went to Oshkosh in 1871. He was president of the Colby Bessemer Iron Company and treasurer of the Northern Chief Iron Company.

LYMAN HUBBELL, proprietor of the Fillmore Avenue Iron & Foundry Works, Buffalo, N. Y., died on May 17, aged 56 years.

NATHAN BABCOCK, founder of the Babcock Printing Press Mfg. Company of New London, Conn., died in his home in Pawcatuck, Conn., May 31, aged 78 years. He was born in Westerly, R. I. At the age of 18 he became an apprentice in the machinist trade at Warwick, R. I. In 1855 he entered into partnership with the late C. B. Cottrell, under the firm name of Cottrell & Babcock, for the manufacture of cotton and woolen machinery. A few years later the firm commenced building power printing presses. In July, 1880, Mr. Babcock retired from the firm. In 1882 he organized the Babcock Printing Press Mfg. Company. He was the secretary and treasurer of the company from the time of organization until that of his death.

WILLIAM S. POST, a well-known inventor of mechanical appliances, died in Boston, Mass., on May 29, aged 69 years. He was a native of Hopkinton, N. Y., and was the author and patentee of a number of widely used inventions, including a down draft furnace, the Post combination boiler, and a refrigerator car.

WILLIAM S. EATON died suddenly at his residence in Boston on June 1. He was born in Boston on April 2, 1817. He was one of the original organizers of the National Tube Works Company, and for 25 years was treasurer. Two sons and a daughter survive him.

JOHN B. SWAIM, formerly president of the Nashua Iron & Steel Company of Nashua, N. H., died on June 3, at his home in that city, aged 74 years. Mr. Swaim was for many years prominent in industrial circles in New England.

Pittsburgh is gradually becoming the center from which all the business of the mills in that section radiates. During the past month much of the business of the National Tube Company that was formerly transacted in McKeesport has been changed to Pittsburgh, where the district offices of the National Tube Company are located in the Frick Building. On May 1 the offices of the Monongahela Furnace department of the National Tube Company were transferred to Pittsburgh. Many of the heads of departments have also been changed to Pittsburgh from McKeesport in the last month. The purchasing department of the McKeesport works has been discontinued, and the purchasing agent, Samuel Lynch, is now located in Pittsburgh.

The Iron and Metal Trades.

What threatened until to-day to be a serious development is the strike among the blast furnace hands at the merchant furnaces in the Shenango and Mahoning Valleys. At one time it caused the banking of 20 blast furnaces, including some of the stacks controlled by Steel works. In the aggregate these furnaces represent a monthly product of about 120,000 gross tons out of a total of about 225,000 to 230,000 tons monthly for the two Valleys.

The latest advices indicate that the strike has failed, so that the trade will not be embarrassed at a time of extreme scarcity by so ill advised a movement.

In the East the Anthracite strike has caused some blowing out and may lead to more. The principal effect thus far has, however, been to force those furnaces which were making Low Phosphorus Pig Iron to turn off, since the Coke available will not permit of making the grade. This means further reliance upon foreign markets, and, as a matter of fact, another round lot of Low Phosphorus Pig has been purchased abroad.

During the week the four interests which now control the Steel Rail mills of the country reached an agreement for 1903 and decided to open the books for deliveries during that year at $28 for Standard Sections at mill. The fixing of that price has caused some surprise in some quarters, since relatively other branches of the Steel trade are higher. It appears that quite a considerable number of large orders have already been placed. We are advised that even now they aggregate between 350,000 and 400,000 tons for 1903 delivery, and include such quantities as over 65,000 tons for the Northwestern, 60,000 tons for the St. Paul, 30,000 tons for the Burlington, 25,000 tons for a leading anthracite road and other large orders. It is certain that very considerable quantities of Rails ordered for this year will not be rolled until 1903, so that the outlook for this important branch is bright. Of course, the productive capacity will be very greatly enlarged by the starting in 1903 of the great new mill which the Lackawanna Steel Company are building at Stony Point, Buffalo.

Steel continues very scarce and foreign Billets are being placed in quantity. Among the recent purchases for a plant on the Delaware is a lot of 15,000 tons. It is understood that a considerable quantity of Canadian Steel has been placed in the last few weeks.

Western railroads are beginning to figure on their bridge building programmes for 1903. On the other hand, it must be noted that some of the Eastern railroads have looked over the ground and have decided to await a more favorable opportunity. It cannot be denied that some consumers are deferring improvements.

A Comparison of Prices.

At date, one month and one year previous.

Advances Over the Previous Month in Heavy Type. Declines in Italics.

	June 4, 1902.	May 28, 1902.	May 7, 1902.	June 5, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard Philadelphia	$19.75	19.75	19.75	15.00
Foundry Pig No. 2, Southern Cincinnati	**19.25**	18.75	17.75	13.50
Foundry Pig No. 2, Local Chicago	**21.50**	21.00	20.00	15.00
Bessemer Pig, Pittsburgh	**21.50**	21.00	20.75	16.00
Gray Forge, Pittsburgh	19.75	19.75	19.75	14.25
Lake Superior Charcoal, Chicago	23.00	23.00	22.50	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	*32.25*	32.00	33.00	24.00
Steel Billets, Philadelphia	....	34.00	33.50	26.25
Steel Billets, Chicago	....	....	....	....
Wire Rods, Pittsburgh	37.00	37.00	37.00	39.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
Spikes, Tidewater	2.00	2.00	2.00	1.80
Splice Bars, Tidewater	1.75	1.75	1.75	1.40
OLD MATERIAL:				
O. Steel Rails, Chicago	**19.00**	18.00	17.50	13.00
O. Steel Rails, Philadelphia	21.00	21.00	21.00	16.00
O. Iron Rails, Chicago	24.00	24.00	24.00	18.50
O. Iron Rails, Philadelphia	24.50	24.50	26.00	19.50
O. Car Wheels, Chicago	20.50	20.50	20.00	16.50
O. Car Wheels, Philadelphia	19.50	19.50	19.50	17.50
Heavy Steel Scrap, Chicago	**19.00**	18.00	17.50	13.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	**2.05**	2.00	1.92	1.55
Common Iron Bars, Chicago	*1.75*	1.80	1.90	1.55
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.45
Steel Bars, Tidewater	1.90	1.90	1.80	1.62½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.40
Tank Plates, Tidewater	**2.00**	1.95	1.95	1.75
Tank Plates, Pittsburgh	1.60	1.60	1.60	1.60
Beams, Tidewater	**2.25**	2.00	2.00	1.75
Beams, Pittsburgh	1.60	1.60	1.60	1.60
Angles, Tidewater	**2.25**	2.00	2.00	1.75
Angles, Pittsburgh	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	**2.25**	2.22	2.25	1.80
Skelp, Sheared Iron, Pittsburgh	**2.35**	2.25	2.15	1.85
Sheets, No. 27, Pittsburgh	2.95	2.95	3.00	3.20
Barb Wire, f.o.b., Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b., Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.00
METALS:				
Copper, New York	**12.40**	12.37½	11.87½	17.00
Spelter, St. Louis	**4.55**	4.50	4.12	3.77½
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	4.00	4.00	4.00	4.30
Tin, New York	**29.65**	29.87½	28.25	27.85
Antimony, Hallett, New York	8.00	8.00	8.00	8.75
Nickel, New York	50.00	50.00	50.00	60.00
Tin Plate, Domestic, Bessemer, 100 lbs., New York	4.19	4.19	4.19	4.19

Chicago

FISHER BUILDING, June 4, 1902.—(*By Telegraph.*)

The most important feature of the week has been the placing of a large tonnage of Steel Rails, Heavy Sections, by railroads for 1903 delivery. The heavy tonnage was largely placed in the West, but important contracts were entered into by Eastern roads also. Details will be found elsewhere. Another interesting feature has been the attitude of Bar Iron mills, some of the largest having advanced prices and withdrawn from the market. This is attributed to two causes, high prices prevailing for Pig Iron and Scrap and the transfer of the capacity of the mills making Bar Iron to Steel Bars. Some independent mills, however, are still willing to accept orders for Bar Iron on the previous basis of prices. The demand for Pig Iron has been unabated and very high premiums have been asked and paid for certain grades for prompt shipment, and higher prices have been current for Southern Iron for late delivery. It is claimed by those who have canvassed the matter thoroughly that there are not over 100,000 tons of Southern Iron left unsold for the balance of the year. The aggravation of labor troubles has tended to further strengthen the market. The declaration of peace in South Africa is looked upon as favoring continued activity and high prices in all sorts of Iron and Steel products, as a heavy demand for all kinds of Structural

Shapes, Rails and machinery is anticipated from that section in the not distant future. There have been offerings of foreign Billets in from 5000 to 50,000 ton lots at prices ranging between $32.50 and $33, Chicago, and some sales have been made on this basis, with others pending. There has been an increased demand for Plates, with larger sales for delivery during the last half of the year. It is worthy of note that the shipments of Merchant Steel into this section during the month of April by one large mill were the largest for any one month within the history of trade.

Pig Iron.—What new developments there have been in the market during the week have favored higher rather than lower prices. The demand has continued active and urgent and with relatively moderate offerings, producers have been able to obtain higher prices for both late and nearby delivery, and resales for immediate shipment have been made at from $2 to $3 per ton above quoted prices. Northern Iron is especially scarce. It is claimed by those well acquainted with conditions in the South, and who have made a careful canvass recently, that there are but 100,000 tons of Pig Iron capacity unsold for the balance of the current year. There have been one or two transactions ranging from 1000 to 1200 tons placed during the week, but the bulk of the business has continued in 50 to 100 ton lots, with also a number of carload sales. As the market reaches a higher level there is less and less relative difference from the various grades, and the difficulty in giving reliable conservative prices increases with the diminishing business. Malleable and Standard Bessemer are entirely nominal in this market, and prices on other grades vary with conditions. We quote as follows:

Lake Superior Charcoal	$23.00 to $24.00
Local Coke Foundry, No. 1	22.50 to 23.00
Local Coke Foundry, No. 2	21.50 to 22.00
Local Coke Foundry, No. 3	21.00 to 21.50
Local Scotch, No. 1	22.00 to 23.00
Ohio Strong Softeners, No. 1	24.00 to 24.50
Southern Silvery, according to Silicon	21.15 to 21.65
Southern Coke, No. 1	21.15 to 21.65
Southern Coke, No. 2	20.65 to 21.15
Southern Coke, No. 3	20.15 to 20.65
Southern Coke, No. 1 Soft	21.15 to 21.65
Southern Coke, No. 2 Soft	20.65 to 21.15
Foundry Forge	19.65 to 20.15
Southern Gray Forge	19.65 to 20.15
Southern Mottled	19.65 to 20.15
Southern Charcoal Softeners, according to Silicon	18.65 to 19.15
Alabama and Georgia Car Wheel	23.00 to 24.00
Malleable Bessemer	22.00 to 22.50
Standard Bessemer	21.00 to 22.00
Jackson County and Kentucky Silvery, 8 per cent. Silicon	23.10 to 24.10

Bars.—Mills of the constituent companies of the United States Steel Corporation and one large independent mill making Bar Iron have advanced mill prices to 2c. to 2.10c., having practically withdrawn from the market, selling agents being instructed to accept no orders, except in a very small way, without submitting the proposed contracts. On the other hand, there are independent mills making Bar Iron hungry for orders. These mills are accepting business on the basis of 1.75c. to 1.80c., and in most cases prompt shipment can be made. The high prices prevailing for Pig and Scrap Iron are said to have influenced the action of large mills in advancing prices. It is claimed, however, that a number of mills heretofore making Bar Iron would be run now upon Steel Bars, the business for which already booked is very large, aggregating several hundred thousands of tons for delivery from July, 1902, to July, 1903. Bar Iron is quotable at 1.75c. to 2.10c. for mill shipment, and 2.25c., full extras, from store, Chicago. Prices for Soft Steel have remained unchanged at 1.75c. to 1.90c.; for Hoops, 2.15c. to 2.25c.; for Angles, 2.25c., base, mill shipment. There is no decrease in the volume of jobbing business, and the market has continued very strong. Soft Steel Bars are selling at 2c. to 2.25c., Angles at 2.50c., and Hoops at 2.50c., base, from store.

Structural Material.—The situation has changed little, if any, during the week. All the mills are heavily oversold on 10-inch and smaller Beams and Channels and on 3-inch and larger Angles and Tees. Some of the mills are oversold from four to six months, while others are discouraging new orders for any time during 1902. The jobbing trade has continued of liberal proportions and full prices have been obtained. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. Small lots of Beams and Channels from local yards are quoted at 2.50c. to 3.50c.; Angles, 2.50c. to 3.50c. rates; Tees, 2.55c. to 3.50c. rates.

Plates.—There has been an increased demand for Plates, with larger individual sales, among them being 1000 tons specials for delivery during the second half of the year. There is a very wide range in prices, depending upon the buyer and time of delivery. Mill prices are as follows: Tank Plate, ¼-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The following are the prices asked from store, the inside prices being to large consumers only: Tank Steel, ¼-inch and heavier, 2c. to 2.40c.; Tank Steel, No. 8, 2.15c. to 2.50c.; Flange Steel, 2.10c. to 2.60c., all f.o.b. warehouse, Chicago.

Sheets.—There has been but a moderate degree of activity. The market has remained firm, with full prices obtained. Mill shipments of No. 27 Black Sheets are quoted at 3.15c. to 3.25c., Chicago, and small lots from store at 3.45c. to 3.55c. Galvanized Sheets are quoted at net prices, mill shipments being held on the basis of 4.35c. to 4.50c., Chicago, and small lots from store at 4.70c. to 4.75c. for No. 27.

Cast Pipe.—The market has remained quiet, but strong, without further change in prices. Cast Iron Water Pipe is quoted by manufacturers as follows: 4-inch, $34; 6-inch, $32; 8-inch and upward, $31; Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—The market has been quiet, but steady, at the recent advance for large sizes. Small sizes have remained steady. Carloads are quoted as follows, random lengths: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—There has been a moderate volume of business, with a steady market, without change in prices. Quotations for mill shipment are as follows:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

The prices from store are as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—Activity and strength continued to be the leading features of the week, without change in prices. One mill reports that shipments during the month of April into this section have been the heaviest for any one month within the history of the trade. Mill shipments are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—Several of the largest Western railroads have covered their probable needs for 1903. Others have placed only a portion of their requirements and are still in the market for additional tonnage. Very heavy transactions are anticipated between now and July 1, when it seems probable that most of the important railroads will have covered their wants for next year. It is reported here that important contracts have been placed by large railroads in the East as well as in the West, in all aggregating several hundred thousand tons. It has been known for some time that these railroads were prepared to place their contracts as soon as prices were named for next year. It is now reported that at a meeting of the presidents of the important Rail mills held during the past week it was decided that the prices current for 1902—that is, $28 at the mill for Heavy Sections—should be continued, and the orders placed have been on this basis. Five hundred tons of 45-lb. Rails are reported to have been sold at $36. There has continued to be an active demand for Light Sections,

with moderate sales. The demand for Track Supplies has also been heavy, Angles, Bars, Spikes, Bolts, Nuts, &c., being placed in several thousand keg lots. Fastening are quoted in carload lots: Splice Bars or Angle Bars, 2c.; Spikes, 2.30c. to 2.40c.; Track Bolts, with Hexagon Nuts, 3c. to 3.45c.; Square Nuts, 2.85c. to 3.10c.

Billets.—The scarcity of domestic Billets, both Open Hearth and Bessemer, has restricted business to a considerable extent, as the demand has continued active. There have been freer offerings of foreign Billets, however, in lots of from 5000 to 50,000 tons, but the only sale that has been consummated during the week is 5000 tons, shipment from Antwerp, for delivery beginning in July, at the equivalent of about $33, Chicago, with the prospect of further sales at between $32.50 and $33, Chicago, within the next few days. Domestic Open Hearth Billets are quoted at $36 to $42, Chicago, according to analysis, time of delivery and responsibility of buyer.

Old Material.—The market is firm, with moderate offerings and a good demand, but there is considerable irregularity in prices. There is a good demand for Relaying Rails, but there are few on the market at the moment and prices are higher. Twelve hundred tons of Old Car Wheels are reported to have been sold at $20.50, but holders are generally asking more. Seven hundred and fifty tons of Old Steel Rails, long lengths, for rerolling, are reported to have been sold at $24.50 and 250 tons of Relaying Rails at $32.50. The following are the approximate quotations per gross ton:

Old Iron Rails	$24.00 to $25.00
Old Steel Rails, mixed lengths	19.00 to 20.00
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	30.00 to 32.00
Old Car Wheels	20.50 to 21.50
Heavy Melting Steel Scrap	19.00 to 20.00
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$22.00 to $23.00
Iron Car Axles	24.00 to 24.50
Steel Car Axles	21.50 to 22.00
No. 1 Railroad Wrought	21.00 to 22.00
No. 2 Railroad Wrought	18.00 to 19.00
Shafting	18.50 to 19.00
No. 1 Dealers' Forge	16.00 to 16.50
No. 1 Busheling and Wrought Pipe	13.50 to 14.00
Iron Axle Turnings	14.00 to 15.00
Soft Steel Axle Turnings	13.50 to 14.00
Machine Shop Turnings	13.00 to 13.50
Cast Borings	9.00 to 9.25
Mixed Borings, &c	9.50 to 10.00
No. 1 Boilers, cut	13.00 to 13.50
Heavy Cast Scrap	14.50 to 15.00
Stove Plate and Light Cast Scrap	11.00 to 11.50
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	14.00 to 14.50

Metals.—There has been a firmer tone prevailing for Copper, with an advance of ⅛c. on Lake, reflecting the higher prices current in primary markets. Lake sells at 13⅜c.. Pig Lead has been in good demand and firm at 4.05c. for Desilverized in 50-ton lots, 4.07½c. to 4.10c. in carload lots. Selling prices on small lots of Old Metals are as follows: Heavy Cut Copper, 11½c.; Red Brass, 11¼c.; Copper Bottoms, 10c.; Lead Pipe, 3.70c.; Zinc, 3c.

Coke.—Early in the week an accumulated supply of New River Coke sold in this market as low as $4.60; subsequently $4.90 was bid, but nothing was available under $5. The market at the close is firm, in sympathy with Eastern markets, but no special activity is reported here. Standard 72-hour Connellsville Foundry Coke is selling at $5.25 to $5.50 and Virginia and West Virginia at $5 to $5.50 per ton, Chicago.

Cincinnati.

FIFTH AND MAIN STS., June 4, 1902.—(*By Telegraph.*)

The Pig Iron market is at present in a state of quietness, though it can hardly be said to be from the usual summer season causes. As far as Southern Iron goes almost, if not absolutely all, of the furnaces have temporarily withdrawn from the market. This is explained as a necessity in order to see just where the orders already booked land them. The supposition is that at a later date there may be some odd lots of even standard grades to offer, but just now nothing definite can be promised. Under these conditions the quotation list again becomes a matter of approximation with the range of $16.50 to $17.50 for No. 2 Foundry, Birmingham basis. Buyers in the main appear to be taking matters philosophically, and while there is considerably more inquiry than there is Iron in sight to satisfy, yet there does not appear to be anything of a panicky feeling regarding the situation, from which is inferred that actual needs for this year are in the main fairly provided for. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$19.75 to $20.75
Southern Coke, No. 2	19.25 to 20.25
Southern Coke, No. 3	18.75 to 19.75
Southern Coke, No. 4	18.25 to 19.25
Southern Coke, No. 1 Soft	19.75 to 20.75
Southern Coke, No. 2 Soft	19.25 to 20.25
Southern Coke, Gray Forge	18.25 to 19.25
Southern Coke, Mottled	18.25 to 19.25
Ohio Silvery, No. 1	21.85 to 22.35
Ohio Silvery, No. 2	21.35 to 21.85
Lake Superior Coke, No. 1	22.35 to 23.10
Lake Superior Coke, No. 2	21.85 to 22.35
Lake Superior Coke, No. 3	21.35 to 21.85

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, ailling grades	$24.00 to $24.75
Standard Southern Car Wheel, No. 2	23.50 to 24.00
Lake Superior Car Wheel and Malleable	23.00 to 24.00

Plates and Bars.—The conditions show but little change, and prices are very strong and market is fairly active. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.90c. to 2c., with half extras; same, in small lots, 2.20c., with full extras; Steel Bars in carload lots, 1.72c., with half extras; same, in small lots, 2.20c., with full extras; Angles, 2.30c. to 2.50c.; Plates, 3-16 inch and heavier, 2c.

Old Material.—Market strong and unchanged. We quote dealers' buying prices, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, $20 to $21; Iron Axles, $23 to $25; Cast Machine Scrap, $13 to $14; Steel Rails, rolling mill lengths, $24 to $24.25; same, short lengths, $17 to $17.50; Car Wheels, $19 to $19.50; Cast Machine Scrap, $14; No. 1 Wrought and Iron Axles on the basis of net tons.

Philadelphia.

FORREST BUILDING, June 3, 1902.

It is very little use to write a report of the Iron and Steel markets under present conditions. These are times when buyers pay very little attention to what is said about prices; what they want to find is some one to furnish material, prices being quite a secondary consideration. The situation in this respect is becoming very serious, as there is no certainty in regard to anything, except that it may be necessary to try a half dozen or a half score sellers before one can be found to guarantee a delivery until late in the year. This fact has become so thoroughly established that attention is now very generally directed to foreign markets, and a considerable proportion of the recent sales have been of foreign production. Prices appear to be very attractive, as compared with home products. The apparent cost for July shipments, c.i.f., duty paid, would be about $18.50, exship, for Middlesbro No. 3 Foundry, and $22.50 for Low Phosphorus, large sales of the latter having been made since the middle of last month. For lots that are already afloat better prices have been paid, say about $20.50 to $21, delivered in consumers' yards in the city or points in the immediate vicinity. It may also be mentioned incidentally that Canadian Iron is coming in pretty freely and is giving very fair satisfaction. Two large foundries commenced melting it last week, and they report that it corresponds very closely with Southern No. 2 Soft, consequently if other conditions are favorable Dominion Iron may be an important factor hereafter. Foreign Steel is also coming in pretty freely, and liberal offerings are made at $30 to $30.50 for German Steel, and it is stated by one of the largest consumers in the vicinity that English Steel of high grade was offered to them and will probably be taken at $31 to $31.50, ship, duty paid.

Pig Iron.—There is little to be said in regard to prices, except that they are liable to be almost anything before the week is out. The difficulty in getting supplies to the furnaces and the unsettled condition of labor makes it reasonably certain that no improvement need be looked for until after midsummer; and perhaps a long time beyond that. It is a little curious, however, to notice that after protesting that there is no Iron to be had, some-

body manages to squeeze out a little when the price is made high enough. It may not be that Peter is forced to transfer his rights to Paul, but sometimes the disappointed ones are inclined to be skeptical in regard to the matter. In any event, with an output of 1,500,000 tons per month supplemented to some extent by imported material of various kinds, there ought not to be the serious scarcity which there appears to be, although with the present outlook it is extremely probable that the June and July output will show a considerable decrease. This may be offset by a falling off in consumption, but we have not got that far yet. Reference has already been made to foreign material, which we quote with American Irons as follows, subject to special premiums of $1 to $2 per ton on deliveries prior to September:

No. 1 X Foundry	$20.50 to $21.50
No. 2 X Foundry	19.75 to 20.50
No. 2 Plain	19.50 to 20.00
Standard Gray Forge	18.50 to 19.00
Ordinary Gray Forge	18.00 to 18.50
Basic	19.00 to 19.50
Low Phosphorus	22.50 to 23.00
No. 3, Middlesbro	20.50 to 21.00
Scotch Irons	21.50 to 23.00

Plates.—There is no falling off in the demand for Plates and orders are not easily placed unless subject to liberal arrangements in regard to deliveries. The demand is not confined to any particular line, as consumers are all working up to their full limits and in the aggregate require an enormous amount of material. Prices are nominally as they have been for several months past, but in actual transactions sellers totally ignore what are called official quotations and make prices to suit themselves, which are usually about as follows: Small lots, 2.10c. to 2.15c. Carload lots and upward: ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C.H. No. 1, 2½c.; C.H. No. 1 Flange, 3c.; C.H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is not the slightest change to note in this department. Deliveries are so far in arrears that new business stands very little chance of attention during the late fall or winter months. Foreign material is helping out on small jobs, but under the most favorable conditions consumers find it very hard to keep up with their contracts. Prices are a little uncertain and in some cases it is said that as much as 3c. has been paid for prompt shipments, but 2.25c. to 2.50c. is probably a fair average for deliveries during July and later, including Beams, Channels, Angles, &c.

Bars.—Reports in regard to prices are very contradictory. Some claim that they can place orders at 1.95c., delivered, for Refined Bars; others say that 2.10c. to 2.15c. is the best they can do, so that it is hard to say what the market is. The former quotation was probably made when there was less pressure on the market, the latter being more up to date. In any event it is not likely that better than 2.05c. to 2.10c. could be done for Refined Iron and 1.90c. to 2c. for Steel Bars.

Sheets.—There is a good demand and prices are working higher on account of the increased cost of production. Prices are about as follows for best makes and a tenth less in carload lots for Common Sheets: Nos. 10 and 12, 2.40c. to 2.60c.; No. 14, 2.70c.; Nos. 16 and 17, 3c.; Nos. 18-21, 3.30c.; Nos. 26, 27, 3.40c.; No. 28, 3.50c.

Old Material.—The market is in a curiously mixed condition, but on the whole prices are lower. Arrivals from abroad are considerable, and as many of the leading mills are not running deliveries are in the meanwhile held in abeyance. Bids and offers for deliveries in buyers' yards are about as follows: Low Phosphorus Scrap, $25 to $26; Heavy Melting Steel, $21 to $21.50; Steel Rails, short lengths, $21 to $21.50; Choice Railroad Scrap, $23 to $24; No. 1 Yard Scrap, $19 to $20; No. 2 Light Forge, $17 to $18; No. 2 Light, old, $15 to $16; Machinery Cast, $18 to $18.50; Iron Rails, $24.50 to $25.50; Old Car Wheels, $19.50 to $20.50; Iron Axles, $29 to $30; Steel Axles, $27 to $28; Wrought Turnings, $16 to $17; Cast Borings, $10 to $10.50.

Birmingham.

BIRMINGHAM, ALA., June 2, 1902.

Compared with the week preceding, the Iron market is practically unchanged. There has been a demand which in volume was fully equal to the supply and exceeding it. Those firms whose efforts are mainly directed yet to catching up with their old business, report the market as rather quieter, while those who are in "the swim" report a demand sufficiently large to keep clean their furnace yards. Conservative members of the trade all confirm the statement that the demand for prompt and nearby shipments keeps them hustling to supply it but in part. While stating this fact it should also not be forgotten that three of our leading interests are yet practically out of the market on this character of business, which, being concentrated on the few in a condition to care for it, constitutes for them an active market. There were sales of Silver Gray at $20 again, and of No. 1 Foundry at $18.50. No. 2 Foundry sold at $17.50 and No. 3 Foundry at $16.50. No. 4 Foundry and Gray Forge range anywhere from $15 to $16. We do not hear of any transactions now on the basis of $12 for No. 2 Foundry, and that quotation may as well be considered as eliminated. For delivery the last half of the year quotations are unchanged and are on the basis of $16 for No. 2 Foundry. While there is no excitement of the market, there is a good steady demand, whose continuance, at present writing, looks promising. The majority of orders are for medium and small size lots, but there is a sprinkling of orders ranging from 1000 to 2000 ton lots, and there is an improvement in the ability to place Iron for delivery during the last quarter of 1902. In circles well posted as to conditions, there is a confident feeling that there will be no material ease up in the situation this side of October, and some are confident that "the handwriting on the wall" means no relief before January, 1903. It is well to remember that there are always two sides to a case. It has been previously mentioned that there was an apprehension that the railroads would advance the freight rates on Iron. And it can be said now that this apprehension has ripened into expectation, and an announcement to that effect would create no surprise nor evoke a protest. Of course business already booked would be protected.

It is stated with an air of authority that the contention between the Tennessee Company and the Sloss-Sheffield Company to obtain (each for themselves) possession of the Lady Ensley Furnace at Sheffield, together with valuable Ore and Coal properties, has been ened, the Sloss Company becoming owners of the property in controversy on terms that are, so far, withheld. Only the bare statement is made that $500,000 was the cost of it. Application at the office for official confirmation or statement met with no success. Officials would neither confirm nor deny the statement. So it can be accepted as substantially correct.

The output of the Steel mill for May was the largest in its history, aggregating 15,000 tons. The battery in service has been gradually increased until nine out of the total of ten furnaces are in operation. The prospects for increased output are fine. The other enterprises at Ensley are in a state of "hustle," being favored with a business that taxes capacity and which is ever on the increase.

A new corporation are on the eve of formation and will probably be called the Shades Valley Iron Company, and will mine Ore and Coal in that valley. Practical and experienced men will control their operations, and they will have ample capital for development of their property. The Calumet Coal Company, capitalized at $50,000, have been incorporated. They will operate in Walker County and under the usual liberal charter. The firm of the Milner-Kettig Hardware Company have increased their capitalization from $125,000 to $500,000, and following close on the heels of this announcement comes the rumor (which yet lacks confirmation) of the combination of certain leading local firms in that line of business. Combination and expansion go hand in hand, lessening the ratio of expense and increasing the area of business territory and the volume of business.

In Coal the business is fine for the season of the year and conditions are reported as flattering. The Coke trade continues to absorb the production of the district, and, because of local inability to fully supply demand, other districts yet market here a material tonnage. Quotation for local make is about $4.25 here.

At last the building of a branch railroad by the Louisville & Nashville Railroad from Talladega to the rich mineral deposits of Clay County has commenced. The territory to be reached contains gold, copper, potters' clay, granite, graphite, brown iron ore and iron pyrites. Concerning the last it is said that an amount of it approximating $1,000,000 in value only awaits means of transportation to be shipped to market. The railroad will rapidly develop that portion of the State and attract by its diversified richness the attention and capital of those who are in pursuit of opportunities for safe investment.

Another labor guild—the plumbers—are on a strike. So far the "bosses" have refused the terms demanded, and there is no prospect of freezing and bursting pipes just now to drive them to precipitate acceptance of enforced terms.

Cleveland.

CLEVELAND, OHIO, June 3, 1902.

Iron Ore.—The delays that have been one of the disagreeable features of the Ore trade this year will, it is expected, soon be at an end, or at least modified. The understanding is that the railroads doing business to the lakes will be able to turn over a larger supply of both cars and engines than heretofore. This will give the boats better dispatch. Even with the delays that have been so pronounced, it is shown that the shippers have been able to bring down the lakes during the month of May more Ore than has ever been carried in the history of the lakes in any one month. The expectations now are that it will figure close to 4,000,000 tons. Should this speed of shipment be maintained it means an enormous increase this year. Everything is conducive to such results, as there is boat capacity and to spare, plenty of dock room, fast unloading machinery and an increasing supply of railroad equipment. The rates of carriage have not changed, but some shippers are asserting that they do not propose to charter any more vessels than they have need for, which will throw many boats into idleness, of which advantage will be taken to effect a change in rates.

Pig Iron.—The strike of the furnace workmen in the Mahoning and Shenango Valleys, which has been threatening since the latter part of April, was called on Sunday. The fires of 13 furnaces have been banked to date. These furnaces are mostly of the merchant class. They are likewise of the smaller type. Most of the furnaces were producing Bessemer and Basic Iron at the time the strike was called. This leaves in operation in the two Valleys 13 other furnaces, the average capacity of which will exceed 500 tons per day. The annoying feature of the strike is not the number and capacity of the idle furnaces, that being an inconsiderable factor in the general situation, but the stacks were producing Iron which was being delivered to the Steel mills. The immediate prospects are the embarrassment of some plants which have been depending upon these furnaces for their Iron. The furnace workmen's organization has been busily engaged in the last few weeks trying to organize the furnaces here in Cleveland, as well as the furnace workmen in the plants of the Steel Corporation and other concerns in the Valleys and in the Pittsburgh district. The officers are claiming great success for their movement, but the outcome is, of course, uncertain. In the meanwhile there is no letting up in the demand for material, but an appreciable increase, and prices are climbing. Foundry grades are bringing $21.50 for No. 1 Valley Furnace and $21 for No. 2. The price is about the same on Bessemer and Basic, although the former will sell nearer to the $22 mark. The supply for quick shipment is not large, but if the curtailment of production now is not too serious there will be some material for sale later in the year. Just now the furnacemen are holding back a little on making sales, expecting to be called upon to use whatever surplus they may seem to have now to fill out contracts later in the year, if it is impossible to effect a compromise with the workmen. The Southern furnacemen are not so situated, and while they have Iron for sale later in the year the Northern difficulty may enhance the price of the Southern product. Foundry Iron in the South is now variously quoted at from $16 to $17 a ton for No. 2 Birmingham, to which is added the $3.70 rate of freight to make up the Cleveland quotation.

Finished Material.—A meeting of the Rail association was held during the week and prices were fixed for next year at $28, being the same price as has prevailed on sales made for this year's delivery. Following this action the railroads have started to buy their material for next year. This is said to be the earliest date that Rails have ever been sold for the coming year's delivery. Inquiries are coming in from the railroads of this territory, the inquiries being received very shortly after the price was fixed. A few sales have also been made. The demand for Light Rails still holds and the price is still soaring. A meeting of the Plate association is also expected to be held during the week to fix prices for the future. The market has heard many rumors that there is to be an advance declared, but the best authorities on this subject discredit the reports. They say that the conditions are ripe for an advance, but the conservative policy of the larger mills may offset the natural tendency of the times and declare for a continuance of the present schedule of 1.70c., Cleveland. Such a policy is lost sight of, however, in the sales which are now being made. There is a little material for immediate disposition and the demand for it is quite eager. The mills having any Plates are selling them now at $2 premium over the association quotation and are having no difficulty whatever in selling all they have at that price. The Bar situation has grown interesting. There seems to be plenty of the smaller Bars, but the large ones are scarce and the market shows a big demand for them. It is even reported in well informed circles that certain of the smaller mills have sold, during the week, quantities of the larger Bessemer Steel Bars at 1.80c., Pittsburgh, or $4 over the market quotation. Some are inclined to censure the mills which are taking the profits as they have heretofore been bound by the association rulings. Bar Iron is now very scarce, but there is a better demand for it than heretofore. The price of Bar Iron and Bar Steel being equal, the former is preferred by some consumers. The demand for Sheets shows but little change and the market is steady at the old quotations. While there has been a steady increase in the trade of all other grades the Sheet trade has been running along evenly, orders keeping a little ahead of the production, but not gaining much. The Black Sheets seem to lead in the buying. Prices are still 2.50c. on No. 10 as a basis on the gauges between 10 and 16, and 3.50c. on No. 27 as a basis for the gauges between 17 and 28. The buying of Structural Steel for delivery during the coming year is very active; there is also a lively demand for quick shipment, and the market shows some interesting developments. It is now learned that some of the smaller mills withheld their tonnage when the season contracting was going on and are now taking advantage of the developments of the market. They have been selling at store prices, ranging between 2½c. and 3¼c., which has been paid without question. Deliveries are possible now in three or four weeks. Store quotations are now the same as those from the smaller mills, the growing scarcity of material having induced some of the jobbers to advance their quotations slightly.

Old Material.—The market has been much more active in the last week than for a couple of months previously, and all of the quotations are exceedingly strong, without, however, any advances noted so far. The demand for Cast Scrap is better than it was, with Heavy Melting Steel both scarce and valuable. Prices are as follows: No. 1 Wrought, $19.50, net; Iron Rails, $27.50, gross; Iron Axles, $26, net; Cast Borings, $10, gross; Wrought Turnings, $15.25, gross; Cast Scrap, $16, gross; Car Wheels, $19, gross; Heavy Melting Steel, $19, gross; Old Steel Rails, $20, gross.

The Belgian Iron Market.

BRUSSELS, May 16.

During the month which has elapsed the markets have remained relatively calm. The general strike which for more than a week stopped the industrial activity in the country terminated promptly, it is true, but its effects have told seriously upon business. Orders have fallen off in quantity. The large producing establishments must restrict since they have not work enough.

Pig Iron is in fair demand, but stocks in Belgium, particularly so far as Mill Irons are concerned, are accumulating. This is explained by the fact that our rolling mills do not buy except strictly necessary quantities. These are not very large, as the result of partial stoppages. The blast furnaces of the Charleroi district ask 55 francs for ordinary Mill Iron, while those at Athus quote 52 francs. The Langwy district has again begun to compete in our country and is offering round quantities as low as 49 francs. The production of Pig Iron during the first four months of the current year in Belgium was 319,795 tons, as compared with 272,960 tons in 1901. The imports were 105,126 and 56,180 tons, respectively, while the exports were 8340 and 3868 tons for the first four months of the two years, making the consumption during the first four months of 1902 416,581 tons, as compared with 325,272 tons during the first four months of 1901.

Scrap Iron is more freely offered and a good deal is being imported, particularly from Holland. From that country we have drawn 14,400 tons during the first four months of the current year out of total importations of 25,000 tons. Our exports of Scrap were 8400 tons in the first four months of 1902. Very little business is doing in Steel. Ingots are quoted at 95 francs, but are not in demand. The market for Finished Iron and Steel has lost a good deal of its animation during the last month or two. Buyers endeavor to crowd prices downward, but the works prefer to lie idle rather than to lower their figures, which are not remunerative now.

The understanding between the Beam mills in Germany, France and Belgium has been renewed, and there is every reason to expect better times. A similar pool exists in Rails.

Our home market has been in a fairly satisfactory condition. Beams, particularly, have profited from the development of building enterprise, while the Sheet mills have worked quite regularly without, however, being rushed. In the Plate trade the mills complain of light orders.

Considerable quantities of Rails have been sold by the Steel works in the Liège Basin, among them being orders for Australia for the Hedjaz Railroad and for China.

For some time our manufacturers have been receiving orders from American houses for export to China and Japan. Since these markets have been in the hands of Belgian mills for so long a time our ironmasters are not interested in entering into negotiations with intermediaries from your side. On the contrary, they fear that negotiations of this character would lead to direct relations between American exporters and customers in China. Therefore the Belgian mills are very reserved in these negotiations, and do not pay much attention to propositions from American middlemen.

Prices for the Belgian home market are as follows: No. 2 Bars, 137½ to 140 francs, f.o.b. Belgian stations; No. 3 Bars and Steel Bars, 142.50 to 145 francs; Beams, 135 francs; No. 2 Plates, 145 francs. For export prices are: £4 16s. for Beams; £5 7s. to £5 8s. for No. 2 Bars; £5 8s. to £5 10s. for Steel Bars; £5 11s. to £5 12s. for No. 3 Bars; £5 14s. for No. 2 Iron Plates; £5 18s. for Ordinary Steel Plates.

Below are given the exports and imports of finished products during the first four months of the current year, compared with 1901:

Belgian Exports of Finished Products.

	First four months. 1902. Tons.	1901. Tons.
Iron and Steel Wire	2,115	1,509
Beams	8,887	8,125
Rails	38,423	33,295
Plates and Sheets	21,590	17,673
Rolled Iron and Steel	81,156	56,136
Nails	4,952	3,215
Shapes	25,143	21,253
Galvanized Iron and Tin Plate	1,301	1,286
Totals	183,567	142,489

The increase in favor of 1902 has therefore been 41,078 tons, or 28 per cent.

The imports of finished products in Belgium have been as follows:

Belgian Imports of Finished Products.

	First four months. 1902. Tons.	1901. Tons.
Iron and Steel Wire	11,489	7,317
Beams	2,657	2,201
Rails	147	588
Plates and Sheets	4,092	3,065
Rolled Iron and Steel	5,831	6,624
Nails	288	222
Shapes	2,555	4,420
Galvanized Iron and Tin Plate	1,857	1,348
Totals	28,916	25,785

Construction shops generally, except for railroad purposes, are suffering from slackness and from sharp foreign competion. This is particularly true of Boiler shops. There is a little more work for the Bolt shops. The Nail mills are suffering as the result of the keenest competition among one another, although they are protected by duties in Belgium to the extent of 4 francs per 100 kg. and need not, therefore, fear foreign competition. The manufacturers are selling Nails at less than the price of Rods. They are beginning to appreciate the situation and an understanding is a good deal talked about among the producers. This would permit the Nail manufacturers to make lower prices for export and to reconquer some of the markets lost.

While the actual situation is therefore unfavorable, there is some hope of a change, and this notably in the direction of the raw materials. Coal, which has been held altogether too high for a long time, shows indications of declining. Every new contract furnishes occasion for some disguised concession on the part of the mines. This was due to the fact that consumers were turning more and more to foreign countries for their Coal, notably to Germany, England and to France. Our importations went on increasing from month to month, while our exports diminished. So far as other raw materials are concerned, notably Pig Iron, Scrap and Steel, there is a decided tendency downward, which is partly due to the fact that apparently the Americans show an indication to stop buying in Europe.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, June 4, 1902.

Pig Iron.—The strike at the blast furnaces in the Mahoning and Shenango Valleys, which at first had a very serious aspect, has materially changed in the last 24 hours, and the chances are that by the end of this week most or all of the idle furnaces will be in operation again. The men have entirely dropped their demand for an eight-hour day, and the whole question at issue now between the furnace operators and the men is one of an advance in wages. It is possible that a few of the furnaces will give their men an advance of about 10 per cent., but other furnaces will start up without any advance in wages whatever. Last night the men at the Thomas Furnace of the National Steel Company, at Niles, and also at their Sharon Furnace, went back to work without any advance in wages. The blast furnace of the Sharon Iron Company, at Sharon, is also in operation. To-day it is expected that the Shenango Furnace Company will get two of the furnaces at Sharpsville started up, and other idle furnaces are expected to resume within a few days. The failure of the men to carry on the strike is due to the fact that their demand for an eight-hour day for blast furnace labor was not feasible, and in addition they were not able to get the men out at the furnaces of the National Steel Company at Sharon and New Castle. It is thought that within a week all trace of the strike will be over, but if some of the blast furnace operators give their men a slight

advance in wages it is probable that all furnaces in the two Valleys will do the same, with the possible exception of the National Steel Company, who have three furnaces at Youngstown and four at New Castle, and at which none of the men are organized. Pig Iron sales in the last few days have been light on account of the strike. Sales of Bessemer Pig Iron in May were extremely heavy, aggregating nearly 200,000 tons, prices ranging from $20.25 up to $21 at furnace, and deliveries in some cases running into April of next year. There would be no trouble in getting $21 at furnace for Bessemer Iron to-day for shipment within the next six months, and the market may be quoted at that price. There is a heavy demand for Gray Forge Iron, and it is reported that a leading consumer has bought about 25,000 tons of Southern Forge at a price equivalent to $18.75, f.o.b. cars Youngstown, Ohio. Most of the large consumers of Foundry Iron are covered, but small lots of Northern No. 2 are held at $21 to $22, Pittsburgh.

Steel.—Not much domestic Steel is being sold, but foreign Billets can be laid down at about $32.25 to $32.50, Pittsburgh, for forward shipment. Domestic Steel, for delivery in the next three or four months, would probably bring $33 to $34, or higher. Some tonnage in foreign Sheet Bars is being sold, and we note a sale of about 2500 tons at a price equivalent to about $32.50, Pittsburgh.

Rails.—The Rail mills have fixed the price of Rails for 1903 delivery in 200-ton lots and over at $28, at mill. A good many inquiries are being received, and a considerable tonnage for next year has already been booked. The Rail mills will carry over into next year a very large tonnage from this year, and these delayed deliveries will take preference in delivery over contracts that are placed now for 1903 shipment.

(By Mail.)

The blast furnace strike is on, and at this writing every stack in the Mahoning and Shenango Valleys, with the exception of three furnaces at Youngstown and four at New Castle, belonging to the National Steel Company, are closed down tight. Labor agitators are at work at other furnaces trying to get the men out, and to-day attempts are being made to get the men to go on strike at the Neville Island Furnace of the American Steel & Wire Company. If the strikers succeed in getting the men out at this furnace it is possible that the trouble may extend to other blast furnaces in the Pittsburgh district. The situation is more serious than the furnace operators had anticipated, and of course will add greatly to the scarcity of Pig Iron, as the shut down of so many furnaces in the two Valleys means a cut in output of 6000 to 8000 tons of Iron per day. At some of the blast furnace plants in the Valleys the men had no organization, but induced the employees to go out on strike by intimidation and threats. This was the case at the three stacks of the Shenango Furnace Company, at Sharpsville, and also at the Thomas Furnace, at Niles, and Sharon Furnace, at Sharon, both owned by the National Steel Company. So far these two stacks are the only ones owned by the National Steel Company that are out. The furnace operators have so far refused to treat with the men, and have not offered them any advances in wages as reported. The next day or two will largely determine how strong an organization the men have and whether the strike is likely to spread to the furnaces in the Pittsburgh and Wheeling districts, none of which so far have been affected. Aside from the labor troubles there is not much of interest to report in the Iron trade this week. The market is exceedingly strong and the restriction in output of Pig Iron by the strike is certain to be felt in Steel and Finished Material. The settlement of the Boer War will have a good effect on general business, and is expected to stimulate demand for such materials as this country shipped to South Africa before the war started.

Muck Bar.—Prices for Muck Bar are steadily advancing, and it is extremely scarce. The best grades are held at $36 to $36.50, Pittsburgh. We note a sale of 500 tons at $36.50, delivered here.

Ferromanganese.—We continue to quote German 80 per cent. Ferro at $49, delivered Pittsburgh. Several good sized sales of German Ferro have been made in this market recently at the above price.

Structural Material.—While all the contracts for big buildings to be erected this year were placed some time ago, a great deal of figuring is being done for next year, and some large contracts for 1903 delivery are being placed. A great deal of work is being given out in this vicinity, the American Bridge Company, McClintic-Marshall, Fort Pitt Bridge Company and Columbia Bridge Company all reporting the receipt of heavy contracts almost every day. Structural concerns are having great trouble in getting deliveries, as none of the mills can make shipments within three to four months or longer after receipt of order. Small lots of Beams and Channels for spot shipment from warehouses and dealers continue to bring 2.50c. to 3c. a lb. There is no change in official prices, which are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh.

Rails.—The Rail mills have fixed prices for next year at $28 at mill. Light Section Rails continue to bring very high prices, and 16-lb. Rails are said to have sold at about 3c. a lb.

Plates.—The Plate Association meets in New York on Thursday, June 5, and while some of the mills may urge an advance in prices, it is not expected any change will be made. Plate mills that have to buy Blooms in the open market have to pay about as high prices for these as are ruling on Plates, and have been urging higher prices for some time. The larger interests, however, believe it will be a mistake to advance prices and will oppose it. Demand for Plates is excellent and two or three of the leading mills are practically sold up for this year. Other mills that are not so well filled up are able to get from $2 to $4 a ton above regular prices for shipment within two to three months. Official prices are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

Bars.—As noted before, heavy consumers have covered for the next four to six months, but there is a fair amount of tonnage being placed, made up of small lots. Some of the smaller mills that roll Iron Bars are said to be willing to make slight concessions on the fixed price of 1.80c., Pittsburgh, but only for good orders. We quote Steel Bars at 1.60c., half extras, for carloads and larger lots, while small lots bring 1.70c. to 1.75c. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra. The total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c., Pittsburgh, extras as per National Bar Iron Card.

Sheets.—Large consumers are pretty well covered for some time ahead, but there is a fairly large demand for both Black and Galvanized. Quite a number of the Sheet mills will close during this and next month for inventory and repairs, and this will reduce output very considerably. We quote No. 27 Black Sheets, box annealed, one pass through cold rolls, for desirable orders, at 2.95c. to 3c., and No. 28 at 3.05c. to 3.10c. Small lots from store bring 3.15c. to 3.25c. for No. 28. Galvanized Sheets are somewhat quiet in demand, but the mills are pretty well filled up on old contracts. We quote at 70, 10 and 5 in carloads and 70 and 5 in small lots from store. All above prices are f.o.b. maker's mill.

Spelter.—The market is firm, and we quote best grades of Spelter at 4.25c. to 4.27½c., Pittsburgh.

Merchant Steel.—The market is very firm, and one of the largest makers is practically out of the market for the next year. The Implement makers placed much larger contracts this year than usual, with the result that the mills are congested with orders, and some of them are indifferent about taking on additional tonnage. We quote Open Hearth Spring Steel at 2.30c. to 2.50c.; Toe Calk, 2.25c. to 2.35c.; Tire Steel, best grades, 2.15c. to 2.25c.; Cold Rolled and Cold Drawn Shafting, 50 per cent. off in carloads and 45 per cent. off in less than carloads in basing territory; Tool Steel, 6½c. to 7c. for ordinary grades and 12c. and upward for best grades, all f.o.b. mill, terms net 30 days.

Skelp.—A little better demand for Skelp has developed, and the tone of the market is firm. Grooved Iron Skelp is about 2.25c., and Sheared, 2.35c. to 2.40c., depending largely on the sizes. Grooved Steel Skelp is about 2.25c., but several very desirable contracts were recently placed at slightly lower prices.

Boiler Tubes.—We note a continued heavy demand, and the mills are comfortably filled for several months. Higher prices for raw material are held responsible for a slight advance in prices of Boiler Tubes. Discounts to jobbers in carloads are now as follows:

Boiler Tubes.	Up to 22 feet.
Steel.	Per cent.
1 to 1⅛ inch, inclusive	45
2¾ inch to 5 inch, inclusive	62½
1¼ inch to 2½ inch and 6 inch to 13 inch, inclusive	52½
Iron.	
1 to 1½ inch, inclusive	42½
2¾ inch to 5 inch, inclusive	50
1¼ inch to 2½ inch and 6 inch to 13 inch, inclusive	40

Merchant Pipe.—The report that an advance in Pipe was recently made or is contemplated has been officially denied. Tonnage is heavy and the tone of the market is very firm. Pittsburgh basing discounts for carloads are as follows:

Merchant Pipe.	Black. Per cent.	Galvd. Per cent.
⅛ to ¼ inch, inclusive	60	48
⅜ to 12 inch, inclusive	67	55

Iron and Steel Scrap.—Large consumers of Scrap have pretty well covered their requirements for the next two or three months and demand in the past week or so has fallen off to some extent. The tone of the Scrap market is very firm, and it is claimed prices are bound to be higher. We quote: No. 1 Railroad Wrought Scrap at $22 in net tons; Heavy Melting Stock for Bessemer and Open Hearth purposes is $21 in gross tons, and heavy sales have been made recently at this price. Rerolling Steel Rails are $22 in gross tons; Car Wheels, $20.50 to $21 in gross tons, and a sale of 300 tons is reported at about $21, Pittsburgh; No. 1 Cast Scrap is $18 to $18.50, and Wrought Busheling Scrap is $18 to $18.50, net tons; Wrought Turnings are $14 in net tons, and Cast Borings, $12, gross tons. Iron Rails are very scarce and bring high prices. We note a sale of 1500 tons of Iron Rails, Rolling Mill Lengths, at $27.50, Pittsburgh.

Coke.—The *Courier* reports the output of Coke in the Connellsville region last week as 248,571 tons. There were 20,653 ovens in blast and only 772 idle. Anthracite furnace operators, who usually use half Anthracite Coal and half Coke in their mixture, have been compelled by the strike to use all Coke and have offered up to $3 a ton for prompt shipments of Furnace Coke. On contracts, Connellsville Furnace Coke is $2.25 a ton, but emergency Coke is held at $2.50 to $3 a ton, and readily commands these prices. Seventy-two-Hour Connellsville Foundry Coke is about $2.75 a ton.

New York.

NEW YORK, June 4, 1902.

Pig Iron.—The market continues exceedingly bare of Iron and the quantities available for delivery at any time this year are becoming smaller and smaller. A moderate amount of Scotch Foundry Iron is being purchased right along for importation, but prices for good standard brands are mounting steadily. The high phosphorus of the Scotch Irons is troubling consumers, who are not accustomed to it. The Anthracite Coal trouble is causing some blowing out, one of the Reading furnaces having stopped. The scarcity of Anthracite proves particularly troublesome to those Anthracite furnaces which are running on Low Phosphorus Pig, which they cannot make with ordinary Coke. Quotations for summer delivery are as follows: Northern Iron, at tidewater, No. 1 X, $21.50 to $22; No. 2 X, $21 to $21.50; No. 2 Plain, $20.65 to $21. Tennessee and Alabama brands are quoted as follows: No. 1 Foundry, $21 to $21.50; No. 2 Foundry, $19.75 to $20.25; No. 3 Foundry, $18.75 to $19.

Steel Rails.—During the week a meeting has taken place between the four leading Steel Rail interests, who are the United States Steel Corporation; the Pennsylvania, Maryland and Cambria companies, controlled by the Pennsylvania Railroad interests; the Lackawanna Steel Company and the Colorado Fuel & Iron Company. The Lackawanna were not a party to this year's arrangement, the mill being idle. It is understood that a satisfactory basis for next year's participation was reached. It was determined to fix $28, at mill, as the price for Standard Sections for 1903 delivery, a figure which is universally regarded as conservative and moderate. It is estimated that the railroads East and West have placed orders for 1903 delivery during the last few days aggregating fully 400,000 tons. Reports as to the tonnage taken by the leading roads vary somewhat. Thus the St. Paul is credited variously with 60,000 and 80,000 tons, the Northwest with 65,000 and 80,000, the Burlington with 30,000 and the Rock Island with 65,000 tons. It is known that some of the Coal roads have put in their orders also.

Finished Iron and Steel.—No very large transactions have been closed during the week, but it is noted that premiums are being more freely paid for guaranteed prompt delivery for buildings and structures. In one case a premium of about 15 per cent. was asked on a building for completion in four months, foreign material to be used in that case. The higher bid was accepted. We quote at tidewater as follows: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 1.95c. to 2.25c.; Tees, 1.95c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c.; Sheared Steel Plates are 1.95c. to 2c. for Tank, 2c. to 2.15c. for Flange, 2.15c. to 2.25c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.80c. to 1.85c.

New Blast Furnaces at Youngstown and Pittsburgh.

Gradually the plans of the United States Steel Corporation for the building of new plants and additions to existing works are being developed. It has been decided by the Carnegie Steel Company to build a fifth blast furnace at the Carrie plant at Rankin Station, Pittsburgh, which now consists of four furnaces. The new stack will be about 105 feet high and 22 feet in diameter, and will have a daily capacity of about 600 tons. It is probable this furnace will be built by the Carnegie Steel Company themselves, which is the case with the new stack now being built at Bessemer. With the completion of this fifth furnace the Carrie plant will turn out about 2500 tons of pig iron per day, all of which will be used in the Homestead Steel Works.

It has also been decided by the United States Steel Corporation to add a fourth blast furnace to the Ohio group of the National Steel Company, at Youngstown. At present the company have three furnaces in operation at Youngstown, each stack being 110 feet high by 21 feet in diameter, and turning out 600,000 gross tons of pig iron per year. The new stack will be an exact duplicate of these in size and will increase the output to 800,000 tons per year. All this iron will be used in the Bessemer works of the National Steel Company.

The Youngstown Iron Sheet & Tube Company, who recently bought Claire Furnace at Sharpsville, Pa., from Pickands, Mather & Co., will take possession of the stack on June 10. The furnace is turning out about 250 tons of iron per day, and this metal will be used in the new basic open hearth steel works now being built by the Youngstown Company at Hazelton, Youngstown.

Metal Market.

NEW YORK, June 4, 1902.

Pig Tin.—Since our last writing the Banca sale was held and what are considered very high figures were realized. About 2500 tons were sold at an equivalent of 30¼c., c.i.f. New York. In this market the holidays interfered somewhat and when business started again on Monday London showed the first sign of weakness. This was most pronounced yesterday, when prices had receded £4 in London, as compared with last Thursday. The London prices affected this market somewhat as to values, but throughout the entire week business was quiet and dull. The deliveries for the month of May were very heavy, showing that a large amount of metal is being delivered against old contracts. At the close to-day the market was quoted as follows: Spot, 29.65c. to 29.90c.; June, 29.10c. to 29.25c.; July, 28.50c. to 29c. London closed £131 15s. for spot and £128 15s. for futures. The total statistics for Europe and the United States, as compiled by the New York Metal Exchange, show:

	Tons.
Total visible supply May 31, 1902	17,018
Against visible supply April 30, 1902	15,596
Against visible supply May 31, 1901	16,991

Copper.—During the last few days the market has been somewhat easier, with sales of Lake as low as 12.40c. Electrolytic and Casting were sold at 12.20c., and are quoted 12c. to 12¼c. Standard was quoted: Spot to August, 11.65c. to 11.85c. The London market has been steadily declining, and was quoted at the close to-day £54 for spot and £54 1s. 3d. for futures. Best Selected is unchanged at £58. The exports for the month of May amounted to 15,339 tons. The total exports since January 1, exclusive of Southern points for May, amount to 81,229 tons, as compared with 39,897 tons for the same period in 1901.

Pig Lead.—There is no change so far as this market is concerned. The Smelting & Refining Company quote Desilverized on the basis of 4.12½c., spot, and 4.10c., 15 days, New York. The London market declined yesterday to £11 2s. 6d. and reacted to-day to £11 6s. 3d.

Spelter.—The market is still in an unsettled condition, with a scarcity of spot and quotations more or less nominal. Spot was quoted at the close to-day 4⅞c., and St. Louis was quoted nominally 4.65c. Producers are not offering freely, nor are consumers showing any dispositon to buy beyond their immediate requirements. The London market declined a shade, being quoted £18 5s.

Antimony—Is unchanged. Hallett's is quoted 8c. to 8¼c.; Cookson's, 10¼c., and outside brands, 7½c.

Nickel.—The situation is unchanged. Ton lots are quoted at 50c.

Quicksilver.—Prices are on a basis of $48 per flask of 76½ lbs. in lots of 56 flasks or more.

Tin Plates.—The market is unchanged. The American Tin Plate Company are quoting for delivery until October 1 on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, or $4, f.o.b. Pittsburgh district.

Machinery at the St. Louis World's Fair.

At one of the sessons of the Boston convention of the American Society of Mechanical Engineers, Lieut. Godfrey L. Cardew of the United States Revenue Cutter Service made an important announcement relative to the World's Fair to be held in St. Louis beginning May 1, 1904. He said that there would be no charge whatever made for the exhibition of machinery in the Government space allotted to this purpose. This space, he explained, is to be larger than all of the space occupied by exhibits at Buffalo. It is to be under the direct supervision of the Government authorities, and light, power and crane service or such other facilities that may be required will be furnished free to exhibitors by the United States Government. Exhibitors will, however, be permitted to have their own attendants in charge of their exhibits, so far as the operation of the machinery, &c., is concerned.

Iron and Industrial Stocks.

The market during the past week has been very dull and has fluctuated only within a narrow range. The failure of the United States Steel issues to attract any public attention continues a puzzle to those interested in these issues, but the details of the conversion with the large commission coupled with it have shocked many investors, while the speculative element finds little temptation in stocks which seem so sluggish as the result of so large a mass. There is a good deal of quiet talk concerning the very large earnings which the United States Steel Corporation must soon show, with their enormous mass of highly remunerative business, but it seems difficult to work up any enthusiasm.

Cramp Shipbuilding & Engine Company.—The statement presented at the annual meeting of the Cramp Shipbuilding & Engine Company compares:

Year ended April 30.	1902.	1901.	1900.	1899.
Gross	$8,202,093	$7,319,000	$7,791,560	$5,300,000
Profit over cost material, labor, &c.	786,147	743,000	913,000	.....
Net after general expenses, interest, &c.	385,236	291,772	536,262	205,612
Dividends, 5 per cent.	242,400	242,400	242,400	.....
Surplus	142,836	49,372	293,862	.....

May 1.	1902.	1901.	1900.
Contracts on hand	$24,730,874	$20,627,000	$20,341,000
Collected on same	11,919,415	5,035,511	8,129,000
Balance to collect	12,811,456	15,591,489	12,212,000

The surplus at the close of the fiscal year April 30, 1901, less adjustment entries, was $1,503,714, leaving surplus assets as of April 30, 1902, $1,646,550. The increase in net earnings for the year ended April 30, 1902, as compared with the year previous, is $93,474. The following directors were elected for the ensuing year: Chas. H. Cramp, Thos. Dolan, Clement A. Griscom, Henry Seligman, William H. Barnes, Samuel Dickson, Morton McMichael, Edwin S. Cramp and Francis L. Potts. The proposed issue of $4,000,000 was not ratified or discussed. It was announced that as the bankers interested in underwriting the bonds preferred that the issue should be increased to $5,500,000, the directors have decided on the issue of that amount, and a meeting of the stockholders to ratify the directors' action will soon be called. The issuance of $5,500,000 bonds will enable the company to wipe out the present issue of $1,500,000 bonds secured by general mortgage, as well as the mortgage of May 31, 1900, on the property bought from the Lehigh Valley Railroad on which the machine shop is located. The latter mortgage amounted to $500,000, but $50,000 has already been paid off and $50,000 more will be paid off on Saturday next. The modification of the plan decided upon will thus leave clear $3,600,000 for new working capital and for betterments.

A meeting of stockholders of the Sharon Steel Company will be held at Sharon, Pa., in August, for the purpose of voting on a proposed increase of the capital stock from $5,000,000 to $6,000,000. The additional money is to be used in paying for the two blast furnaces and four open hearth furnaces which are now being built.

Dividends.—The International Silver Company have declared a quarterly dividend of 1 per cent. on their preferred stock, payable July 1. Books close June 14 and reopen July 2.

The Consolidated Lake Superior Company have declared the regular quarterly dividend of 1¾ per cent. on their preferred stock, payable June 16.

Cramp Shipbuilding & Engine Company directors have declared the regular quarterly dividend of 1¼ per cent., payable June 15.

The National Enameling & Stamping Company have declared the regular quarterly dividend of 1¾ per cent. on preferred and quarterly of 1 per cent. on common stock, payable July 1.

The Finished Steel Company, Youngstown, Ohio, manufacturers of cold rolled shafting up to 5 inches in diameter, have sold their entire business interests to Fitzsimmons & Co. of Cleveland, Ohio, also manufacturers of shafting. E. Davey, president of the Finished Steel Company, will continue in charge of the Youngstown works, which will be operated as heretofore.

The Buckeye Malleable Iron & Coupler Company.

The present plant of the Buckeye Malleable Iron & Coupler Company, manufacturers of high grade malleable iron castings and the Little Giant Buckeye coupler, is located in the northern part of Columbus, Ohio, but the company are now building a new steel casting plant located just south of the southern city line. The new plant occupies 32 acres and is on the Toledo & Ohio Central and Hocking Valley railroads. The principal buildings are L shaped, the main building being 840 feet long by 150 feet wide, and the L is 560 feet long by 100 feet wide. The power station and pattern shop occupy separate buildings. Three open hearth furnaces are being installed, two of these being of the Wellman-Seaver tilting type. At the start one furnace will be operated as a basic and two as acid furnaces. Two additional furnaces will be installed later. At the beginning the plant will have a capacity for melting 180 tons of steel a day, and the concern will be making castings in September or October. In the main building there are two 30-ton and three 10-ton overhead electric traveling cranes; in the cleaning and annealing department there are two 10-ton overhead electric cranes, and there is one 10-ton overhead electric crane over the stock yard. In addition to these cranes there will be 15 small jib cranes distributed throughout the works.

The Worcester Machinists' Strike.

WORCESTER, MASS., June 2, 1902.—Friday, being a legal holiday, all the shops were shut down, and most of those who do not run Saturday afternoon did not start up their engines Saturday morning. So there was little opportunity for developments. The only incident worth recording was that 22 of the machinists employed by P. Blaisdell & Co. went out Thursday. They had been expected to go out the Monday previous, when the provocation was just as great as it was on Thursday, work from the Prentice Bros. Company's shop being in the Blaisdell shops Monday morning. But for some reason the men did not go out for several days. The Blaisdell people were crippled only a little, and the business will go along much the same as usual.

There are indications that a break in the strike will come within a week. The employers, notably the F. E. Reed Company and Prentice Bros. Company, have made little effort to hire new help. They preferred to give their old men a chance to return to work under the old conditions. The ringleaders of the strike will not be taken back, but all other men will if they apply soon enough. But the patience of the employers will soon become exhausted, and then gangs of new men will be set at work without warning to the strikers. The picketing continues everywhere, but there has been no disorder of any sort.

The Vulcan Crucible Steel Company.—The Vulcan Crucible Steel Company, with offices in Second National Bank Building, Pittsburgh, and works at Aliquippa, Pa., manufacturers of high grade crucible tool steel under the patents and processes of Dr. W. A. Otto Wuth, are getting estimates on an addition to their plant, which will consist of eight single puddling furnaces, 10 and 14 inch mills, a 1000-pound hammer, annealing furnaces, with boilers, engines, &c. The concern will make these additions as rapidly as possible.

The Clairton Steel Company.—PITTSBURGH, PA., June 4, 1902.—(*By Telegraph.*)—The Clairton Steel Company, who are a subsidiary interest of the Crucible Steel Company of America, and who recently took over the St. Clair Furnace Company, building three blast furnaces at Clairton and the St. Clair Steel Company, building Bessemer and open hearth works at Clairton, have also elected new officials as follows: W. P. Snyder, president; Frank B. Smith, vice-president, and Julius Bieler, treasurer. An Executive Committee has been elected, consisting of James H. Park, W. P. Snyder, Robert E. Jennings, Reuben Miller, A. W. Mellon and Frank B. Smith.

The Valley Furnace Strike.

The following telegrams received to-day give the latest information concerning the effect upon the blast furnaces in the Shenango and Mahoning Valleys of the strike inaugurated by the blast furnace hands for an eight-hour day:

CLEVELAND, OHIO, June 4.—All operating furnaces were banked and not blown out. M. A. HANNA & CO.

SHARON, PA., June 4.—Telegram received. Furnace banked. May shovel out. STEWART IRON COMPANY.

CLEVELAND, OHIO, June 4.—Alice and Ella are both banked. PICKANDS, MATHER & CO.

YOUNGSTOWN, OHIO, June 4.—Furnace banked. BRIER HILL IRON & COAL COMPANY.

CLEVELAND, OHIO, June 4.—Our furnace is banked. THE STRUTHERS FURNACE COMPANY.

SHARPSVILLE, PA., June 4.—The three Shenango furnaces banked Monday evening. SHENANGO FURNACE COMPANY.

YOUNGSTOWN, OHIO, June 4.—Our furnace is banked. YOUNGSTOWN STEEL COMPANY.

LEETONIA, OHIO, June 4.—Furnace is in operation. SALEM IRON COMPANY.

SOUTH SHARON, PA., June 4.—Furnace still in operation. THE SHARON STEEL COMPANY.

YOUNGSTOWN, OHIO, June 4.—Banked one furnace and blown out the others. THE ANDREWS & HITCHCOCK IRON COMPANY.

LOWELL, MAHONING COUNTY, PA., June 4.—Furnace was blown out for relining April 27. THE OHIO IRON & STEEL COMPANY.

SHARPSVILLE, PA., June 4.—Furnace blown out May 27 for repairs. PERKINS & CO.

CHICAGO, ILL., June 4.—Furnaces are banked. REPUBLIC IRON & STEEL COMPANY.

PITTSBURGH, PA., June 4.—Leetonia Furnace in operation, Fannie Furnace banked on account of strike. THE CHERRY VALLEY COMPANY.

May Fluctuations in Iron Stocks.

The following sales show the fluctuations in the quotations of the stocks of iron and steel companies:

Cap'l Issued.		Sales.	High-est.	Date. May.	Low-est.	Date. May.
$10,000,000	Am. Bicycle Co., com.	14,750	7½	6	6	3
20,000,000	Am. Bicycle Co., pref.	9,700	23½	2	20⅝	5
10,000,000	Am. Bicycle Co., bonds.	128,000	69	8	63	15
20,000,000	Am. Car & F'dry, com.	78,200	32⅝	28	29¼	19
29,000,000	Am. Car & F'dry, pref.	13,900	91¼	28	88¾	17
	Am. Locomotive, pref.	36,400	95⅝	2	91	3
15,000,000	Bethlehem steel.....	....	..	..	..	..
45,000,000	Cambria Steel.....	18,000	24⅞	3	23	17
17,000,000	Colorado Fuel & Iron.	325,300	108¾	1	95¾	20
24,410,900	Crucible Steel, com...	....	..	..	..	..
24,399,500	Crucible Steel, pref...	....	..	..	..	..
1,975,000	Diamond State Steel.	5,400	1¾	20	1½	20
15,000,000	Inter. Pump, com....	2,500	55	2	53	5
8,850,000	Inter. Pump, pref....	700	91	5	90½	3
11,000,000	International Silver..	15,500	19	13	12⅝	1
10,750,000	Pa., new, com., Phila..	....	..	..	..	..
16,500,000	Pa., new, pref., Phila.	4,400	92½	1	90¼	27
12,500,000	Pressed Steel, com....	92,200	50¼	28	43	19
12,500,000	Pressed Steel, pref...	11,100	88	26	83	19
27,191,000	Rep. Iron & St., com..	28,000	19½	1	16⅝	19
20,306,900	Rep. Iron & St., pref.	15,500	75¼	1	72¼	13
7,500,000	Sloss-Shef. S. & I., com.	200	31	22	30½	22
6,700,000	Sloss-Shef. S. & I., pref.	100	92¼	3	91	6
20,000,000	Tennessee Coal & Iron.	149,600	71¼	1	61½	19
1,500,000	Tidewater Steel.....	1,650	7	14	5½	27
510,361,300	U. S. Steel Co., com..	418,000	42½	1	38⅜	19
508,511,200	U. S. Steel Co., pref..	208,650	92⅜	7	89¾	27
1,500,000	Warwick I. & S.....	2,200	5⅛	27	4½	17

John Eichleay, Jr., Company.—The business formerly conducted by John Eichleay, Jr., of Pittsburgh, of house moving and structural steel has been discontinued under this style and will be conducted in the future under the name of the John Eichleay, Jr., Company, a corporation of which the former owner, John Eichleay, Jr., is the senior member and president. John P. Eichleay is vice-president and Walter B. Eichleay is secretary and treasurer.

The Abrasive Material Company, Philadelphia, Pa., are making extensive improvements to their plant, their largely increased business having made it necessary for them to increase their facilities for the manufacture of emery wheels. A two-story brick addition, 70 x 100 feet, is in course of erection, and when complete will be used for grinding, mixing and other purposes, the machinery for which is all of a special type and is manufactured by themselves. Later it is expected that a new kiln will be built and other improvements made.

Chicago Machinery Market.

CHICAGO, ILL., May 31, 1902.

The Situation in General.

The record of May in the machinery market throughout this section has been one of continued activity. Although some dealers report a slight falling off in new orders, others have experienced the largest volume of business in their history.

A number of orders for full new outfits for machine shops have been taken, but as a rule business placed has been rather for renewals coming from manufacturers who are extending their works and otherwise making improvements. Some dealers report during May the heaviest billing of machinery for any one month within their experience, but this results from the fact that large shipments on previous sales had been made during May from the factories rather than that shipments on new orders were especially heavy.

Without exception, manufacturers report the spring trade now ended as very satisfactory, with an excellent outlook for the summer, there being business in sight for months ahead. There is still much difficulty experienced from the delayed shipments, manufacturers meeting with many disappointments in obtaining material. On heavy tools they are as far as ten months behind in making deliveries, while on small tools shipments are from 30 days to several months behind orders. Some manufacturers call attention to the fact that there is a disposition among jobbing shops, as well as among the larger and more advanced manufacturers, to equip with the best modern machine tools. In addition to the increased capacity already prepared for, additional improvements calling for new equipment are being projected.

In the line of engines, boilers and pumps the month of May has been very satisfactory, the demand being not only active, but urgent, for large engines especially, with orders in hand which insure activity for months to come, and further business of moment pending. There has been a steady increase for the call of gas engines during the last 60 days, but the difficulty in obtaining material has militated against prompt shipment, and manufacturers are not guaranteeing early delivery. The question of prices seems to be secondary to delivery, buyers as a rule requesting prompt shipment. Some manufacturers report orders already booked for approximately a year ahead. Although some plants are running at full capacity and have already increased their output 50 per cent., they are unable to keep pace with the new business. The demand for second-hand engines and boilers has continued very active.

The demand for second-hand tools of all kinds has continued urgent, and in many cases the old tools are sold before they can be replaced by the new.

The business in cranes and power transmitting machines has continued especially active and very satisfactory. It is worthy of note that the orders for grain elevating machinery and belt conveyor outfits has been so liberal that manufacturers have work ahead for 90 days, and all work, too, is being taken from prices from 10 to 15 per cent. higher than those current from two to three months ago.

The demand for all kinds of supplies, especially the call for foundry equipment, has been and is testing the capacity of both manufacturers and dealers, calling for increased working forces. The only cloud on the horizon seems to be labor troubles present and prospective. As a rule, however, the opinion seems to be prevalent that all such difficulties will be adjusted soon.

There has been a good inquiry for catalogues and circulars from the foreign trade, and also some little business has been placed for foreign shipment, but the domestic trade is so heavy and urgent that less attention is being paid to the expansion of foreign business. In not a few cases as the summer season approaches both dealers and manufacturers have anticipated a falling off in domestic trade, but orders continue to pour in, being stimulated by the higher prices asked and the further tendency toward a higher level of value.

With some local manufacturers the demand for small tools has increased enormously during the month, and the demand for heavy tools has been in excess of the supply.

The position in which manufacturers of wind mills find themselves at the present time is especially interesting, some of the more important having experienced a phenomenal business and, although they are turning out more than 100 per cent. more goods than a year ago, they are scarcely able to fill more than one-half the orders booked, and have been obliged to call in traveling men and otherwise cease efforts to obtain new trade, until such time as the factories are in a less crowded condition.

Machine Tools.

The Kempsmith Mfg. Company, Milwaukee, Wis., find trade unusually active judging from the inquiries and orders being constantly received for plain and universal millers. They note not only that considerable attention is being given to properly equipping tool rooms with modern machines, but find an increasing interest in the adoption of millers by jobbing shops and by establishments manufacturing special lines of machinery. They have reason to believe that the buying movement will continue with unabated force throughout this year.

McDowell, Stocker & Co., Chicago, state that the condition of business has been very satisfactory during the past month. If the last week of the month proves as good as the three weeks previous it will be the largest month that they have had since the firm were organized. They have taken several complete machine shop outfit orders, but the most of the business has been from old concerns in this vicinity. The present outlook for a good summer's business is the best that they have ever experienced.

B. F. Barnes, Rockford, Ill., states that the condition of business during the past month has been very satisfactory, the volume of orders keeping up very well indeed, considering that we are now coming into the summer season, when naturally business begins to slacken to a certain extent. There seems no reason why there should not be a continuance of good trade.

Hill, Clarke & Co., sales office Chicago, report heavier billing of machine tools during May than during any previous month any year. This is due largely, however, to the fact that shipments have been made on the heavy sales made early in the spring, the new sales of tools during the past month being a little under rather than over those of April. The same general character of trade as previously reported continues, with special shipments of mining tools to Denver and the lake region. The demand for planers, millers and lathes is still quite active, with considerable business pending. Prices of many tools are tending upward, and some manufactures have already advanced.

The New Doty Mfg. Company, Janesville, Wis., are making some additions to their plant and will build further during the summer; they will also add considerable new machinery. Business is excellent, the company having all they can do for some months ahead.

Manning, Maxwell & Moore, sales office Chicago, report a very satisfactory trade during the month of May in the general line of machine tools, with shipments of special importance to Wisconsin, Iowa and Texas, although orders received have covered the general field throughout the West. There is a tendency toward higher prices, and some manufacturers have already advanced their lists on special tools. There is still much difficulty experienced because of delayed shipments from the factories, manufacturers being behind from 30 days to as far as ten months, the latter on heavy tools.

The Ransom Mfg. Company, Oshkosh, Wis., during the past month have secured quite a number of orders for grinding machines, motor driven, most of them for new plants. Although they have a good share of business on hand at the present time, they note a slight letup in orders which is no more than expected at this time of the year. They have shipped several foreign orders, but with raw material so high they have been obliged to raise prices to the foreign trade, which is interfering to some extent with that part of their business. Full

prices are readily realized in the domestic trade, however, which business offers better inducements to manufacturers at present.

J. H. Dawson Machinery Company, Chicago, have been selling fairly of both new and second-hand tools. They have made considerable progress since the fire which caused both damage and delay in their business. They are now in position, however, to execute orders speedily.

Engines, Boilers and Pumps.

Allis-Chalmers Company, Chicago, have experienced a large and satisfactory business during the month of May, there still being an urgent demand for large engines, crushers and other heavy machinery. The orders already booked are sufficient to insure continued activity for some months to come and other contracts of importance are pending. The construction of the West Allis Works, at West Allis, Wis., is being pushed to full limit, and large forces are still working night and day. One of the largest machine shops is about completed, and two others are well along, while the two last of the five are but little more than started. A large portion of the equipment of one large shop has been installed, and work is already in progress. Many contracts have been placed for the equipment of the other machine shops, but others are pending. The company will have spent, when the works are completed, $3,000,000 for construction and equipment. As portions of this mammoth plant are completed some relief is given to the overtaxed capacity of the old works.

A. L. Dawson & Co., Chicago, have made a number of gratifying sales of gas engines during the month. Taking the month of May as a whole the volume of business has been very satisfactory.

The Strang Engine Company, with offices at Chicago and works at Harvey, Ill., have begun active operations; machinery is moving and castings have been made. Within 30 days they will have ten engines, from 3 to 5 horse-power, on the floor. It has been the policy of the company not to attempt to make sales until the first ten engines are ready to exhibit, when sales will be made by sample.

The Quincy Engine Works, Quincy, Ill., have enjoyed a fair share of business since they started their new plant, and at present see no indication of hard times. During the past month they have had many inquiries for engines of the larger sizes which they believe will lead to good business as soon as the buyers are ready to place orders.

The Otto Gas Engine Works, Chicago, have found a steady increase in buying for the last 60 days, and a corresponding difficulty in getting material. The whole machinery world seems to fear a famine, and almost any kind of manufactured articles seem to meet ready sale.

The Nordberg Mfg. Company, Milwaukee, Wis., are receiving numerous inquiries, most of them asking for early deliveries, which it is impossible to guarantee. The question of price seems to occupy a secondary position, delivery occupying the first place. They are booking orders only for deliveries approximately a year hence, and are impressed with the idea that the activity in the line of engines will continue for years to come.

The Weber Gas & Gasoline Engine Company, Kansas City, Mo., find that business continues very good, there having been a steady gradual increase during the first five months of this year. They are running their plant at the present moment at full capacity, are well booked with orders, and the prospects for future business are very encouraging indeed. They have lately completed an addition to their foundry, increasing its capacity 50 per cent., have also erected another iron building for the wood working department, and another iron building for the galvanized iron department.

The Webster Mfg. Company, Chicago, Ill., say that business is very brisk. They have lately added to their equipment a 16-foot Pond boring mill, enabling them to take care of more of the large work that is coming in. They have also put in tools in the sheet iron and machine departments.

The Charter Gas Engine Company, Sterling, Ill., find that business continues to crowd them, making an additional building necessary, the plans for which are about completed. Their orders in all lines have been very satisfactory, especially for portable engines, which they shipped last week into four States: Georgia, Texas, Iowa and Kansas. They anticipate being snowed under as for several years past, before the summer trade is fairly launched.

E. O. Williams, Chicago, has experienced a fair trade in second-hand engines and pumps during the month. Sales have been made to various sections and shipments have been made promptly, but the supply of desirable pumps is still somewhat under the demand, which in special cases have been urgent.

The American Steam Pump Company, Battle Creek, Mich., advise us that business is especially good and they can see no reason why it should not continue through the summer months. They already have orders for their output for at least 90 days. Collections are good.

The Union Steam Pump Company, Battle Creek, Mich., have made increased shipments of their manufacture. They have found settlements reasonably prompt and a general good feeling prevailing. Prompt shipments for urgent wants seem to be the rule.

Filer & Stowell Company, Milwaukee, advise us that the coremakers' strike is about over. They believe that in another week the trouble will have been of the past.

Cranes and Power Transmitting Machinery.

Pawling & Harnischfeger, Milwaukee, Wis., advise us that the condition of business is entirely satisfactory. Some of the orders recently booked by them are as follows: The Falk Company, Milwaukee, one 30-ton, with 5-ton auxiliary hoist; Best Mfg. Company, Pittsburgh, one 2-ton; American Foundry & Construction Company, Hazlewood, Pa., two 10-ton; Fairbanks, Morse & Co., Beloit, Wis., one 15-ton; Warren City Boiler Works, Warren, Ohio, one 10-ton; McClintic-Marshall Construction Company, Pottstown, Pa., one 25-ton; Colorado Fuel & Iron Company, Bessemer, Col., one 20-ton; Kutztown Foundry & Machine Company, Kutztown, Pa., two 10-ton; Jas. B. Clow & Sons, Chicago, one 3-ton; Modern Steel Structural Company, Waukesha, Wis., one 15-ton; Nordberg Mfg. Company, Milwaukee, one 2-ton jib; Pennsylvania Railroad Company, Altoona, Pa., two 12½-ton; the Chapman Valve Mfg. Company, Indian Orchard, Mass., one 20-ton, with 2-ton auxiliary hoist; the Milwaukee Electric Railway & Light Company, Milwaukee, one 30-ton; Warren Steam Pump Company, Warren, Mass., one 15-ton; Allis-Chalmers Company, Edw. P. Allis Works, West Allis, Wis., two 5-ton wall and one 2½-ton wall; the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio, one 12-ton; American Bridge Company, Pencoyd plant, Pa., one 25-ton; Baldwin Locomotive Works, Philadelphia, six 10-ton; Gardner Governor Company, Quincy, Ill., one 5-ton; American Sheet Steel Company, Scottdale Works, Scottdale, Pa., two 5-ton specials; the Stillwell-Bierce & Smith-Vaile Company, Dayton, Ohio, two 20-ton, two 10-ton, four 5-ton; the Bucyrus Company, South Milwaukee, one 3-ton; Midvale Steel Company, Philadelphia, one 10-ton.

The Stephens-Adamson Mfg. Company, Aurora, Ill., have fully 90 days' work ahead, orders consisting largely of contracts for grain elevator machinery, belt conveyor outfits and power transmitting machinery. They are not making promises for immediate deliveries, and all work is being taken at prices from 10 to 15 per cent. higher than those in vogue two or three months ago. They recently placed an order for a set of large rolls and shears for increasing the capacity of their sheet metal work department. The demand for this class of machinery is most excellent.

The Industrial Works, Bay City, Mich., say that business with them for the past several months has been very satisfactory and with orders fully equal to the output.

The Whiting Foundry Equipment Company, Harvey, Ill., state that the volume of business continues most satisfactory. They are spending $30,000 in tools and for additional room.

Tools and Supplies.

The Gardner Governor Company, Quincy, Ill., are having as much of a rush as they have had during any of the previous months of this year. Prosperity seems universal—the demand for goods not being confined to any one locality—the orders coming from all sections. They are crowded in all departments and have been obliged to increase their working force and also their machinery equipment to keep up with the demand. The general tone appears healthful, but they think labor troubles may have a tendency to quiet the times. "It is a little too early to make any prediction as to what the actual effect will be, but it is natural to presume that it will not be beneficial."

Charles H. Besly & Co., Chicago, advise us that business is very good. They are receiving orders for Gardner grinders with spiral grooved disks from all parts of the United States, especially from the West and Northwest. The sales of Gardner grinders are increasing so that their factory at Beloit, Wis., is taxed to its utmost to meet the demand. Owing to the increasing demand for Helmet temper taps it has been found necessary to install new machinery at their factory to aid in promptly filling orders. They are having numerous requests from foreign countries for catalogues and circulars relating to their specialties.

The Hoefer Mfg. Company, Freeport, Ill., say that business continues to more than hold its own; in fact, they have more than they can handle.

The Chicago House Wrecking Company, Chicago, report that conditions are very much the same as they were 30 days ago. The company are away behind on billing orders, finding it impossible to keep up with the demand for second-hand material. They believe they could sell many times as much machinery if they had it. No trouble is found in disposing of boilers and engines as fast as they can secure possession of them. They have sold all but four of the large Manning boilers from the Pan-American Exposition, and have only two of the exposition engines left. They report a demand for power ranges for from 50 to 100 horse-power. The improvements to their plant are still in progress, and orders are being placed for equipment. They have unbounded faith in the outlook for this fall's business, and are sure that 1902 will be a "banner" year.

The Novelty Iron Works, Dubuque, Iowa, say there is little to report regarding the condition of business during the month of May, excepting that orders have continued to pour in faster than they can be filled. They had been expecting a falling off in business about this time. Some trouble is still experienced in getting material promptly, and if the present volume of business continues it will be difficult to supply all demands for fall trade. The company have built and tested a Ross hammer of special design for use in shovel factories, which has proved entirely satisfactory, and duplicate orders have been received. Good results are expected in the field of trip hammers. The outlook for fall trade is much better than at this time last year.

Joseph T. Ryerson & Son, Chicago, say that the demand for tools of small capacity has increased enormously, while that for the heavier class continues to be far in excess of the supply. The condition is so acute that good second-hand tools are sold before their successors can be installed. Inability to secure high grade steel castings within a reasonable time is distressing machinery manufacturers, and their shops are far in arrears. Among the more important sales during May made by the firm are the following: Atlantic Coast Lumber Company, Petroleum Iron Works, Phœnix Iron Works Company, Delaware, Lackawanna & Western Railway, Frank Trenkhorst, Risdon Iron & Locomotive Works, Lackawanna Steel Company, Standard Oil Company, John Baizley Iron Works, Penman Steel & Iron Works, Texas & New Orleans Railway, Variety Mfg. Company, Practical Gas Construction Company, Chicago City Railway Company, James MacGregor, Geo. McArthur, Wm. Bros Boiler Works, McNut Boiler Works, Missouri Boiler Works, John O'Laughlin Stone Company, Holthoff Machinery Company, Marine Boiler Works.

The Stover Mfg. Company, Freeport, Ill., have experienced a phenomenal business in wind mills thus far this year and although they are now turning out more than 100 per cent. more goods than a year ago they are not able to fill more than one-half of the orders booked. They have called their traveling men from the road, and have ceased all efforts to stimulate trade until they can make the factory end more nearly correspond with the demand. Future prospects are exceedingly bright and assure all the business they can possibly handle. The company are now planning to run their hardware factory by electricity, and will connect with the power plant at the new factory. They are receiving a large amount of business in the hardware line as well, and both factories are running to full limits.

The Philadelphia Machinery Market.

PHILADELPHIA, PA., June 2, 1902.

There has been no diminution in the volume of business in the Philadelphia machinery market during the past month. In some cases there has been a marked increase in the number of orders, but often the total of these will not aggregate much more in money value than a smaller number placed during some of the recent months. Some manufacturers are not anxious to take on new business of great importance, particularly on which long time deliveries would be necessary.

Shops in such cases are full of work for the balance of the year, and in view of the scarcity of raw materials, and the uncertainty in regard to the anthracite coal miners' strike, are using their best efforts to fortify their own positions. The anthracite miners' strike, if prolonged, will seriously affect manufacturers in this territory; some have already had to resort to bituminous coal for fuel, and others are preparing to do so, while the effect of curtailments in the production of raw material will affect them still further, and delay deliveries even more than at present.

Inquiries for machinery and tools of all kinds have continued very actively and have resulted in most cases in satisfactory business with little delay.

Foreign demand continues to drag, there appearing to be no great effort on the part of manufacturers to go after this trade, particularly when the domestic demand is so heavy. Some business, however, continues to be done, and this is of a satisfactory nature.

There is no improvement to be noted in general deliveries. In the case of special tools and heavy machinery they have been further extended. The inability to get raw materials promptly continues, and in many cases it is hard to get deliveries on various special parts not manufactured by the builders of tools and machinery. This latter condition has frequently held up what would otherwise have been a fairly prompt shipment.

Both iron and steel foundries continue extremely busy, and deliveries from these sources have not improved. The scarcity of pig iron has materially affected the foundries and the shortage of anthracite coal will for the time being prevent betterment. A few plants are well supplied with both fuel and raw material, but they are an exception to the rule.

The demand for heavy machinery, special tools and large engines, boilers and cranes, continues to be the most active and deliveries on these lines are necessarily extended, while inquiries and orders for the smaller machine tools, engines, boilers, &c., are reported to be of a very satisfactory nature. Sales of the latter class have increased during the month and deliveries in some cases, particularly in standard tools, are fairly prompt; in other cases the same delays are experienced as with the larger tools, &c. Machine shop supplies have had an active month, and considerable difficulty is experienced in getting prompt shipments except in standard goods.

Prices generally are much firmer, and it is said that with the present prices of raw material it is quite probable that advances must be made.

The Midvale Steel Works continue busy in all departments of the plant. Improvement to the equipment of the works is going on continually. Estimates have recently been asked for an addition to their rolling mill.

The Philadelphia Machine Tool Company have had a

good month. Inquiries and orders have been satisfactory, and all departments of the plant are being operated at their best capacity. Among work under construction is a number of their standard presses and shears. A large circular shear is also building for Western parties. Recent shipments include a number of presses for local and Western delivery and a heavy special milling machine has been delivered to Pittsburgh parties.

The Hess Machine Company, manufacturers of file making machinery, have recently shipped for export one set of machines for delivery in Russia, two sets for England, and one set for German deliveries. A number of machines are also building on domestic orders, and trade conditions are said to be excellent.

Thomas H. Dallett & Co. have recently shipped several electric and rope driven portable drills for delivery to Western and New England parties and to various local manufacturers. Rock surfacing machines have also been shipped to Eastern concerns. General business is reported by them to be in quite satisfactory condition, inquiries are numerous and some good orders have recently been booked.

The Philadelphia Pneumatic Tool Company will on June 1 remove to their new plant at Twenty-first street and Allegheny avenue, which is now nearing completion, and of which previous mention has been made in these columns. This company report a very gratifying condition of trade and a good number of orders have been taken. Some recent shipments include pneumatic rammers to Jones & Laughlins, Limited, Pittsburgh, Pa.; the Lackawanna Steel Company, Buffalo, N. Y., and to a number of other plants. Steamships, railroads and other shops are taking large numbers of pneumatic riveters, hammers and chippers.

The Franklin Machine Works have recently shipped one of their No. 2 slab milling machines to Michigan parties and a large horizontal floor boring, milling and drilling machine and a cold saw and grinder to a New England concern. They have also made several local deliveries of large tools. Business conditions are reported as very satisfactory and inquiries have been particularly numerous during the past month. All departments of the works are being operated at their best capacity.

I. H. Johnson, Jr., & Co. continue active in all departments, the demand for lathes remains satisfactory, and a large amount of work is on their books. They are preparing to erect a new three-story brick office and drawing room, 37 feet 6 inches by 36 feet 4 inches, at the northeast corner of Fifteenth and Callowhill streets, on completion of which they will be able to use the space now occupied for the above purpose for an addition to the erecting shop, giving them over 3000 square feet more floor space. Recent shipments of tools by these parties include one 36 inch by 32 feet special boring and turning lathe, and one 36 inch by 52 feet tool, with two sets of heads, &c., making it practically two tools. Two lathes, one 36 inch by 17 foot and one 36 inch by 35 foot, have also been shipped to New England parties and a number of smaller tools have been delivered to various local parties.

The Philadelphia Roll & Machine Company continue busy in every department. Inquiries are numerous and a large amount of business is on the books. Among the work in course of construction may be mentioned a number of roll mills and roll lathes for the Harrisburg Pipe & Pipe Bending Company, Harrisburg, Pa., and a large number of rolls for the various steel works to a number of which deliveries have also been made. Recent shipments also include a Tropenas converter for the Benjamin Atha Steel Works, Newark, N. J., and various heavy castings for local concerns.

The American Pulley Company continue very busy. Inquiries are reported to be of a satisfactory nature and booking for various sized pulleys good. This company are now producing daily over 400 pulleys of different sizes, close to their normal capacity under present conditions. The foreign trade with them continues active, and though no increase in business is noticeable in England and on the Continent, that of South America, Africa, New Zealand and Australia has largely improved. Among some recent shipments of pulleys in carload lots are deliveries to San Francisco, Cal., Seattle, Wash., Mexico and the Middle West. Export deliveries in quantity have also been made to New Zealand and Australia.

Dienelt & Eisenhardt have had a good month. Inquiries and orders keep numerous and all parts of their plant are being operated to the full capacity. Some large oil cloth printing machines are building for export and there have been satisfactory shipments of hammers and jacks to various parties.

The Keystone Drop Forge Company, who have recently purchased 2½ acres of ground for a site for their new plant on the Delaware River front at Chester, Pa., have plans prepared and are receiving estimates for the erection of the buildings, which consist of a brick machine shop, 50 x 90 feet; engine and boiler house, 30 x 60 feet, and a hammer shop, 60 x 80 feet. Operations, it is expected, will shortly be begun. Some of the machinery and hammers for the new works have already been contracted for, but they are now in the market for the engines and boilers. It is expected to install a 150 horsepower engine and two boilers of either 100 or 125 horsepower each.

The Link-Belt Engineering Company are very busy on all classes of work. Inquiries are numerous and the estimating department has had more work than could be well handled. The new addition to their drawing rooms is rapidly nearing completion, and when ready for use will greatly relieve the congested condition of other departments. A good percentage of general work is being taken and shipments of the same nature are going forward continually.

The Tabor Mfg. Company under the press for molding machines have been compelled to put on a night force at their plant, besides having a large amount of work done by outside parties. Many inquiries are being received and a good proportion of orders are being taken. Recent deliveries include six molding machines of various sizes to the General Electric Company, Schenectady, N. Y.; one 16½ x 20 inch power rammer for the Benjamin Atha Steel Works, Newark, N. J. A large vibrator frame machine has been shipped to Pond Machine Tool Works at Plainfield, N. J., and a 14 x 16 inch split pattern machine was delivered to the Niles Tool Works, Hamilton, Ohio; both the latter for the Niles-Bement-Pond Company. A 13 x 20 inch power rammer has been furnished the American Locomotive Company, Dunkirk, N. Y., plant, and another has been delivered to South Baltimore Foundry Company, Baltimore, Md. Two machines have also been sold for delivery in England.

The Eynon-Evans Mfg. Company have recently moved their pattern and machinery supplies storage department to an adjoining three-story brick building, and will utilize the space vacated in enlarging the pattern and machine shops. The capacity of the former will be increased three-fold, while that of the latter will be doubled. Considerable new machinery has been installed, including a 66 inch by 24 foot lathe. They are in the market at the present time for two more lathes, one 36 inches by 20 feet and the other 42 inches by 25 feet. A new two-story furnace building or foundry is to be erected. It will be 100 x 21 feet and two stories high and will greatly facilitate the work in that department. Inquiries are reported to be of good volume and the resulting business very satisfactory; some nice orders have been taken for blowers and condensers and a large amount of pattern work has been placed on the books.

The Energy Elevator Company, who were recently incorporated, have had a busy month. A great many inquiries are coming in and a large amount of business is on their books. Some recent shipments of elevators include a large freight lift to Two Harbors, Minn., and another to Baton Rouge, La. An invalid lift has been installed for Spring Lake, N. J., parties, and a trunk lift has been built for Ocean City, N. J., parties, it being the fourth of the kind. Elevators have also been shipped to Hagerstown, Md., and Willston, Ohio, and a special hoist for lifting a drawbridge has been shipped to Hampton, Va. There has also been a large amount of local work completed and installed by these parties.

At the Baldwin Locomotive Works continued activity may be noted and every department is being operated to its full capacity. A large number of new tools have already been installed and orders for many more have been placed, both for new equipment and replacement. They are building at Eighteenth and Hamilton streets a new tank shop, 179 feet 4 inches by 72 feet, and have just begun the erection of a new boiler shop on Buttonwood street, Fifteenth and Sixteenth streets, 397 by 80 feet 2¼ inches. This shop will be erected over the present foundry now occupying the ground, and will be constructed without interfering with the operation of the foundry. The shop will practically be a second story of the foundry, although supported by steel structural work of its own, and will be about 35 feet high, which is also the hight of the foundry. Business conditions generally are said to be very satisfactory, 128 engines of various types having been built during the month of April. Shipments during the past month include deliveries on account of orders from the Denver & Rio Grande Railroad, Southern Pacific Railroad, Choctaw, Oklahoma & Gulf Railroad, Atchison, Topeka & Santa Fé Railroad and others, as well as to various individual concerns.

Chambersburg Engineering Company of Chambersburg, Pa., are building an addition to their foundry which will double their capacity. The building is 60 x 150 feet, and is expected to be completed in course of the coming month. In addition to this they have installed a number of new tools, lathes, planers, drills, &c. They have recently completed an order for 16 riveting machines for the American Car & Foundry Company, and similar orders to locomotive works, steel plants, &c.

The Royersford Foundry & Machine Company, Royersford, Pa., are making a number of improvements to their plants. A new two-story stone office building has been erected and an addition made to the machine shop, which will enable them to employ 40 more men. Business conditions are very satisfactory and they are running all departments of the works to their full capacity. Recent shipments of punches and shears include one No. 3 combined machine for Carl Binder, Chicago, Ill., and several of these machines have also been shipped for New England and Pennsylvania delivery.

The Detrick & Harvey Machine Company, Baltimore, Md., are busy in all parts of their plant and are running nights in their efforts to keep up with the demand for planers. They are now building two 72-inch horizontal drilling, milling and boring machines for R. Hoe & Co., which will make four of that size which Hoe & Co. will have in operation. Orders have also been received from the Lorain Steel Company for a 48-inch open side planer, the sixth of that kind that has been put into their Johnstown plant. Beaman & Smith have ordered a 36-inch planer, it being their second open side, and the Baldwin Locomotive Works, Philadelphia, have ordered two 36-inch, which will make six open side planers in operation at that plant. Deliveries continue active and shipments of planers and drills are being made to many concerns.

The Diamond Drill & Machine Company, Birdsboro, Pa., advise us that business conditions with them have never been better, a large quantity of work being already booked and more in prospect. Among recent shipments may be mentioned the last material for the Pope Tin Plate Company's mills and some hydraulic machinery for abroad. They are busy in all parts of the plant, engaged chiefly on rolling mill work, such as shears, table lathes, &c.

The American Spiral Pipe Works, Chicago, have issued their 1902 catalogue, containing general and special information about spiral riveted pipe, connections and fittings of special import to a large number of consumers. Spiral pipe is recommended by the manufacturers for the following: Water mains, irrigation, hydraulic mining, water conduits, leader pipe, exhaust steam, smoke stacks, packing houses, blower pipe, suction pipe, discharge pipe, cold storage plants, sugar plantations, sugar refineries, hot air heating, air compressors, mine ventilation, building ventilation, tunnel ventilation, paper and pulp mills, railway water stations, &c.

The American Steel Foundries Company.

Official announcement of the formation of the American Steel Foundries Company was made last week. A change in the plans of the promoters has been made by which the proposed capital stock to be issued for the acquisition of the various properties and the cash and working capital will be reduced from $17,500,000 7 per cent. preferred stock and $17,500,000 common stock to $15,000,000 6 per cent. cumulative preferred stock and $15,000,000 common stock. It is stated that these reductions were secured in purchase price of plants and expense of consolidation and organization. Shearson, Hammill & Co. have been selected as syndicate managers, to succeed Harris, Gates & Co. An official circular has been issued, which in part is as follows:

In the matter of the American Steel Foundries, which is a consolidation of the following six companies: American Steel Castings Company of New Jersey; Reliance Steel Castings Company, Limited, of Pittsburgh, Pa.; Leighton & Howard Steel Company of St. Louis, Mo.; Franklin Steel Casting Company of Franklin, Pa.; the Sargent Company of Chicago, Ill., and the American Steel Foundry Company of St. Louis, Mo.

A syndicate was formed, which had subscribed the necessary cash requirements. Some differences as to the syndicate and the organization arose, and upon conference it was deemed best by and for all concerned that Harris, Gates & Co., who were the managers of the syndicate, retire and that other syndicate managers proceed with the matter.

The steel men who are the principal subscribers to the syndicate furnishing the financial requirements, in meeting with the parties interested in the plants, determined that the matter be taken up by Shearson, Hammill & Co., Mr. Shearson of that firm having just retired as comptroller of the United States Steel Corporation. We are informed by Mr. Shearson that Jones, Caesar & Co. have made full investigations, examinations of the business of these companies and have certified to the earnings shown by the syndicate managers' statement.

As stated in the circular, a president has been selected, but pending action upon his resignation by the steel company with which he is now connected, he has requested that his name be withheld from publication.

It is expected that the syndicate will be concluded within a week and arrangements made for the new company to take over the properties of the above companies as an operating company by July 1. For each $100 subscribed there will be issued to the syndicate one share of preferred stock and one share of common stock of the par value of $100 each. The earnings for the fiscal year ending July 1, 1902, of the companies whose properties and business will be acquired are at the rate of 6 per cent. upon the preferred stock and more than 6 per cent. upon the common stock to be issued by the new company.

The Wheeling Roofing & Cornice Company.

The Wheeling Roofing & Cornice Company of Wheeling, W. Va., advise us that it is their intention to erect a sheet mill and open hearth furnaces in connection with their new plant now under construction at New Martinsville. The company have purchased 45 acres of ground, in addition to the 5 acres donated by the city of New Martinsville, on the main track of the Ohio River Railroad. They are erecting a tin mill, 60 x 320 feet, containing eight pots, with provision for 12 more, all of improved duplex pattern, producing 120 boxes per 24 hours and equipped with Taylor's patent automatic trimming machines; galvanizing shop, 70 x 320 feet, equipped with four pots, two Mesta picklers, four sheet straighteners, weighing machines, &c.; corrugating shop, 60 x 200 feet, equipped with special machinery, the invention of F. Taylor, general manager; conductor pipe shop, 60 x 200 feet, with a capacity of 200,000 feet per 24 hours; eave trough shop, 50 x 150 feet, equipped with Taylor patent machinery, producing 500,000 feet per 24 hours; hanger shop, 36 x 250 feet, in which will be made cut offs, elbow miters and other

small articles, and a building, 180 x 400 feet, for stamped ceiling and ornamental stamped metal work, equipped with machinery to stamp in one operation sheets that are now stamped in four operations.

The New York Machinery Market.

NEW YORK, June 4, 1902.

A good general demand is reported in all quarters of the trade. There is nothing startling to report in the way of large orders. The demand runs in small orders. The strength of the market is indicated by the advances in prices that were made the first of this month. We are informed that three Western lathe builders have advanced their prices about 5 per cent. A slight advance in shapers is also reported from Cincinnati. A good sized order for machine tools was placed by the Scranton Steam Pump Company. It included a number of heavy tools, and was awarded to the Prentiss Tool & Supply Company of New York. In power station equipment the largest transaction reported was the closing of the engine order in connection with the new station of the Springfield Street Railway Company of Springfield, Mass. The order involved a 3000 horse-power unit and was awarded to Westinghouse, Church, Kerr & Co. A vertical compound Corliss Westinghouse engine will be furnished. Westinghouse, Church, Kerr & Co. also received an order from the Consolidated Railway, Light & Power Company of Wilmington, N. C., for a 400 kw. Westinghouse steam turbine.

A short time ago mention was made in this column of a report to the effect that Westinghouse, Church, Kerr & Co. had been retained as engineers for the New York terminal and tunnel of the Pennsylvania Railroad. At the time this could not be confirmed, but we are now officially advised that it is a fact. The work of perfecting the plans, preparing specifications, &c., is being actively pursued now. McKim, Meade & White of New York are the architects selected for designing the New York station. The new officers of Westinghouse, Church, Kerr & Co. are: Walter C. Kerr, president; George Gibbs, first vice-president; Henry J. Conant, second vice-president; W. W. Churchill, third vice-president; Carl M. Vail, secretary and treasurer. It will be observed that Walter C. Kerr succeeds Herman H. Westinghouse as president of the company. George Gibbs, who is the new interest, suceeding Mr. Kerr as first vice-president, is well known in engineering circles. He is a member of the New York Rapid Transit Commission and a member of the Board of Engineers appointed in connection with the Hudson River tunnel problem. He was formerly identified in Western railroad projects, was with the Baldwin Locomotive Works and has been connected with various Westinghouse interests.

Orders have been placed for the equipment of the Pacific Light & Power Company's plant, at Los Angeles, Cal. The boiler order was awarded to the Stirling Company. It called for 1000 horse-power. McIntosh & Seymour obtained the engine order. The Westinghouse Electric Mfg. Company obtained an order for a 750 kw. generator.

The National Acme Mfg. Company have completed the removal of their Hartford, Conn., screw machine plant to Cleveland, where their new plant will be placed in operation in about two weeks. Upward of 50 families were moved from Hartford to Cleveland. The plant will employ about 300 hands when in full running order.

The Interstate Foundry Company of Cleveland have placed contracts for the erection of a large addition to their foundry on Tod street. The building will be 300 feet long and 250 feet wide. It will be covered by a 100-ton crane, which will have a run of 100 feet outside the building. Kaltenbach & Gries, Cleveland, are engineers for the erection of the foundry.

The C. & G. Cooper Company of Mt. Vernon, Ohio, are installing considerable new machinery in their machine shop. They have just installed a large Morton shaper on heavy work on large engine bed plates.

The Water Works Department of Toledo have rejected bids recently turned in on 400 tons of cast iron pipe, and new proposals have been called for.

The Thresher Electrical Company of Dayton, Ohio, have secured the contract for electrical machinery for the battle ship "Virginia." Their bid was $105,000.

The Boston & Montana Consolidated Copper & Silver Mining Company are making considerable additions to the electrical equipment of their smelters and refineries at Great Falls, Mont., having recently purchased 11 15 horse-power and three 40 horse-power Westinghouse, 500 volt, shunt wound, direct current motors. About four years ago this company installed a number of Westinghouse 180 volt, electrolytic generators and at the same time put in a large number of Westinghouse and other motors for driving ventilating fans and other machinery about the smelters. Although the smelters are filled with sulphur dust and are extremely dirty, the motors have given satisfaction.

The Q & C Company, manufacturers of railway specialties, machinery and pneumatic tools, will operate in their own name, commencing June 1, principal offices in Western Union Building, Chicago; New York office, 114-118 Liberty street, with their general sales department located at their shops, Chicago Heights, Ill.

PERSONAL.

John Hays Hammond, the well-known mining engineer, arrived from Europe on Saturday by the "Lucania."

William Filbert, assistant comptroller, has succeeded Edward Shearson as comptroller of the United States Steel Corporation.

John F. Budke of Canonsburg, Pa., has resigned as president of the Parkersburg Iron & Steel Company, Parkersburg, W. Va.

William H. Baldwin, formerly secretary of the National Steel Company, at Youngstown, Ohio, has donated $25,000 to the Youngstown Free Kindergarten Association for the erection of a building and extension of their work.

Clarence M. Mendenhall, who recently resigned the position of superintendent of motive power of the Chicago & Alton Railroad, has been appointed assistant to the general manager of the Pressed Steel Car Company, at Pittsburgh. He will be in direct charge of the engineering work of all the plants.

R. W. Finlayson of H. P. Gregory & Co., engineers and general machinery merchants, Sydney and Melbourne, Australia, is now visiting manufacturing establishments in this country.

John F. O'Rourke of New York, a prominent contractor and an alumnus of Cooper Union, has contributed $5000 to the endowment fund of that institution. Mr. O'Rourke is the second alumnus to so contribute.

Benjamin Talbot, the inventor of the continuous open hearth furnace, who has been seriously ill, is reported to be recovering. He had come over from England to witness the starting of the new Talbot plant at Jones & Laughlins, Limited.

A. J. Moxham, who has retired from the management of the Dominion Iron & Steel Company of Sydney, starts on a month's yachting cruise to-day.

R. F. Howe, one of the partners in the Deering Harvester Company, Chicago, has been elected a director of the South Chicago Furnace Company, succeeding D. M. Cummings.

The annual election of officers of the Hecla Iron Works, North Eleventh street, Brooklyn, N. Y., held June 2, resulted in the re-election of the following officers: Nels Poulson, president; Charles N. Eger, vice-president; Francis D. Jackson, secretary, and F. S. Bellvue, treasurer.

According to the *Boersen Courier* of Berlin, Herr Krupp has brought to perfection a gun, the projectile from which is capable of penetrating the best and thickest armor plate he manufactures. Emperor William has already witnessed trials of this gun, and His Majesty has exacted a promise from Herr Krupp to reserve it exclusively for the use of the German navy.

HARDWARE.

ONE of the secrets of American industrial success is the extraordinary ingenuity and skill in turning out great quantities of goods at a minimum of cost. To this end the genius of her inventors contributes, while for its attainment the investment of capital is on a liberal scale unthought of until recent years. In almost every branch of the Hardware and metal trades it is necessary for the manufacturer, in order to score a commercial success, to give his attention to the production of goods in large quantities and by the most economical processes. In many lines the competition is so close and the margins of profits have been so narrowed that it is only by doing a heavy volume of business that he can obtain anything like an adequate return for his investment of capital and labor. This tendency toward the production of articles at the lowest possible cost is fostered also by the popular demand for goods at the lowest obtainable prices. In a great many lines it has for years been necessary to put on the market goods which sell at a very low price, too low a price, indeed, to be consistent with fair quality. Hence, manufacturers have often been driven to producing goods of low quality which serve a temporary purpose, but are in the long run quite unsatisfactory and more expensive to the user than if costing considerably more as of better material and workmanship. Under the stress of business exigencies some manufacturers doubtless find it their policy to turn out such goods in great quantities, making the matter of quality an entirely secondary consideration. Such manufacturers are to be regarded as filling a necessary place in the commercial organism, but their position is not nearly as desirable nor their business interests as well secured as if they were among the fortunate number who are permitted to make the quality of their products a leading consideration and carry on a profitable business in goods which are regarded as setting the standard of excellence for the trade. The names of many manufacturers will occur to our readers of whom this is the case, and suggest at once high quality and a successful career.

The practice of making special brands for the jobbing trade is one which manufacturers generally regret, and to which they give their adhesion only under the pressure of what they deem a necessary compliance with the wishes of their wholesale customers. Under a normal condition of things the manufacturer should get the benefit of reputation which goods of real excellence may command from the trade in view of their quality. Apart from the money which is paid for the Axes or Saws, for example, there should be the added advantage which comes from the good opinion which the tools win for themselves in the estimation of those who put them to practical use. Many a manufacturer has found in the increasing value of his trade-mark compensation for years of comparatively unprofitable business, in which he was doing little more than making a reputation for his products, as a result of which there was a gradual and healthful enlargement of his relations with the trade, and for his products a more secure place in the market. When his customers in the jobbing trade desire goods made with their own brands there is, of course, the sacrifice on his part of the advantage which their sale under his own name would give. Whatever their quality, whether good or bad, does not redound to his credit or discredit. The trade at large does not know that he is the manufacturer. If the goods are superior the jobber who controls the trade-mark which they bear reaps the advantage. The manufacturer, even though he has put into the goods all the excellence of which his factory is capable, gains no reputation throughout the trade or with the public. The fact indeed that his factory has produced the goods is usually kept by the jobber a profound secret. And very properly so. The fact, too, that the goods have been produced by a given manufacturer for the past year or more is no guarantee that there will be the same source of supply in future. Indeed, it is a common practice for the jobber, before placing his order, to negotiate with different manufacturers, and the contract for a new lot is placed with the factory whose prices and terms are the most satisfactory. It is obvious that this state of things cannot be pleasing to the manufacturers who put forth their best efforts in producing goods of high grade, the sale of which under their own brand would give them a reputation. It is plain, too, that this system militates against the quality of goods which are made under special brands, as the manufacturer is without the usual incentive to turn out the best work, especially as such special brands are usually furnished at lower prices than his best goods command.

Condition of Trade.

With the entrance of the summer and the coming of warm weather there is a relaxing in the pressure of business as between the manufacturers and larger merchants. This condition is accepted as entirely normal and does not indicate any lessening of prosperity or any weakening in the tone of the market. Few manufacturers are in a position in which they are anxious at the present time to secure orders for future delivery. Many of them will be fully occupied for some time in clearing up their order books and accumulating even a fair stock with which to carry on next season's trade. Various influences are tending to keep prices steady and to give them, in a good many lines, something of an upward drift. The high price of material and its scarcity is an important influence in this direction. Wages are also in nearly all factories higher, gradual and individual advances taking place from time to time, while in some cases there have been specific increases in the remuneration of the workmen. The ease with which goods are sold also gives manufacturers confidence in maintaining prices, and they are thus enabled to realize better profits than has often been the case. There is an excellent business doing between the retail merchants and the jobbers or manufacturers from whom they draw their supplies, and their orders are frequent and for well assorted lots. Season goods are naturally in especial request. The wisdom of those who covered their requirements early in the year is finding illustration in many lines in which there is a good deal of trouble in obtaining goods at this late date. The number of those, however, who deferred buying is said to be comparatively large. A feature of the trade which deserves notice is the steady and large demand for Builders' Hardware, a line in which manufacturers find it difficult to execute orders promptly. The gradual broadening of the field covered by Hardware is receiving the practical attention of many alert and enterprising merchants who are considering the feasibility of adding to their assortment goods which are found to go harmoniously and advantageously with a Hardware stock. In spite of the large domestic demand export business continues in excellent volume. The losses in certain directions are, it is thought, fully made up by gains in others. The financial

condition of the trade throughout the country is very satisfactory. Few failures are reported, and there is little serious complaint in regard to collections.

Chicago.

(By Telegraph.)

June starts out under auspicious circumstances without any decrease in the demand. The call for goods is well distributed, but is especially active for Wagon Material, Bars, Bolts, Nuts, Spokes, Rims, Tires, &c. There continues to be a falling off in the demand for various kinds of Wire and Steel Nails, but Cut Iron Nails are scarce and wanted. The demand for Screws has continued on a liberal scale and the market is in an improved condition, prices being steadier and less disposition is shown to court trade by making concessions. The warm weather during the week has increased the demand for all lines of summer goods, including the list given during the past few weeks, while there is an especially active demand noted for Stove Boards and Bicycles continue to meet with unexpected favor. The difficulties attending the distribution of Screen Doors, especially certain sizes, and Ice Cream Freezers of special make continue as previously indicated. The demand for Builders' Hardware, especially Butts and Locks of improved make, has continued active and manufacturers are still pressed to make appointed deliveries. Some cheap goods are being put upon the market, but, as a rule, meet with little favor from the best trade, and prices for desirable makes are very strong. An important development during the week of special interest to Hardware dealers is the determination of independent Wire Nail mills to curtail production during the next three months; at least this is the consensus of opinion which prevailed at a recent conference at Chicago of the independent Nail manufacturers. While there was no agreement entered into that such action will be taken, the sentiment that it would be wise not to feed a slow market with unnecessary supplies which prevailed will doubtless control the situation. It is not impossible, however, that the difficulty in obtaining domestic Billets may have influenced the manufacturers in this decision, but the heavy offerings of foreign Billets at more reasonable prices may obviate this difficulty. Dealers in Heavy Hardware emphasize the fact that not only is the business transacted during each succeeding month this year greater than the corresponding month of a year ago, but the trade each succeeding month is greater than during the preceding 30 days. Usually business transacted during May is of less volume than in April, but the reverse is the case this year. The month indicates that some large jobbers are still feeling the pulse of the trade, preparatory to an effort for another combination, but generally these efforts are not looked upon seriously by the local trade.

Louisville.

W. B. Belknap & Co.—The market continues to show encouraging conditions. There is certainly a great demand for goods and no promise of over supply in any quarter. This is accented by the actual scarcity of coal east and the threatened reduced quantities of soft coal mined in the West should operations in the latter district be interferred with. The matter is necessarily a serious one, though it does not look serious in certain aspects. It would seem as though the settlement of it had not been undertaken in earnest yet. We do not know what the demands of the miners were, but whether reasonable or unreasonable, they seem to have had no consideration or definite deliberation over them. They must be either so absurd that the operators do not care to consider them at all, or else there is some unexplained reason for refusal to do so. It may be to enforce a scarcity in the home market for heavy steel and iron products that it is held up. This artificial means would seem to be unnecessary, as there is an immense amount of building, construction and enterprise of every sort in sight, enough to take up the ordinary output for the rest of the year. As peace, so long deferred, has apparently been consummated in South Africa, we believe it will be in the anthracite coal regions, despite talks of holding out to the "bitter end" by both parties. The "bitter end" is a favorite expression with the daily press, but before it gets to be extremely bitter, it is generally arrived at by one party or the other, and when one arrives there the other does too, as it takes two to make or keep up a quarrel.

The recent rains have benefited the crops in this section so that agricultural prospects are very good.

New coal and oil developments in the State are being constantly made, and the prospects are extremely flattering for added wealth through those channels.

The impartial editorial treatment by *The Iron Age* of the proposed Hardware trust or combination and of those on the outside has elicited a great deal of favorable comment. The arguments pro and con gave its readers a good deal to think about and doubtless helped to form correct judgments where there was some doubt as to the premises. Its pages were certainly most interesting reading, reflecting as they did opinions from leading minds, both of manufacturers and merchants all over the country.

Cleveland.

The W. Bingham Co.—The market in this section continues very steady, and a large volume of general Hardware business is coming our way. There is an excellent demand for all kinds of spring goods. The first orders for these goods have gone forward and our customers in all sections seem to be having a good trade, as they are beginning now to duplicate their orders on many kinds of these same goods.

This is true in a very large measure, as far as Refrigerators, Ice Cream Freezers, Steel Goods, Lawn Hose, Screen Doors and Windows, Wire Cloth, Netting, Lawn Mowers, Grass Hooks, Step Ladders, &c., are concerned. In fact, the dealers seem to have had an early trade on these goods and the demand still keeps up. The steady and unchanging prices which have prevailed for some time back on many lines, and especially on Nails, Wire, Sheet Iron, Tin Plate and other staple goods, go a great way to assure the trade that prices are not going to slump off right away, and they are not afraid to order all kinds of Hardware in good quantities. Therefore they are not afraid to stock up, and the fine weather that we have had in this neck of the woods has gone far to stimulate the trade.

The farmer, artisan and merchant seem to have plenty to do and are happy and prosperous.

Portland, Oregon.

Corbett, Failing & Robertson.—The planing mills of our city have refused to grant the nine-hour day, and 13 affiliated unions in the building trades are out on strike. If no settlement is reached by to-morrow night all organized labor will go out. Twenty-four hundred are now involved, and next week will probably see 7000 to 8000 idle mechanics and laboring men. Of course, business in the city is at a standstill, and Hardware stores might as well be closed as open for all the business they are doing. Outside trade is fair, but does not show the life it ought to at this time of the year. The weather is partly accountable for this, as it is cold and backward. Still, prospects for the future cannot but be considered bright should our labor troubles be settled within a reasonable time.

Prices of late are being badly cut in this territory. There are too many houses competing for the trade that offers.

We regret that Hardware consolidation was not effected, as we think it would have tended to remedy many of the evils now in vogue.

San Francisco.

Pacific Hardware & Steel Company.—There is nothing particularly new to report, except that conditions are about the same as in our last letter. Business is good. Orders are coming in freely. One thing, however, can be said about the coast trade, which is that the export business from San Francisco is increasing; all steamers leaving San Francisco being crowded with freight, and in many instances part of the cargo has to be left behind for the next steamer.

The jobbing houses on the coast are all carrying a very large stock for the export trade, and are doing a large business in consequence. There is considerable time saved in shipping the goods direct from San Francisco, and this is appreciated by the trade of adjacent foreign countries.

Money is coming in very freely and the financial condition is very good indeed.

Philadelphia.

SUPPLEE HARDWARE COMPANY.—Trade during the month of May in wholesale Hardware circles has been of considerable dimensions, although it unquestionably would have shown a much greater aggregate in amount had it not been for the miners' strike, which, in sections tributary to our city, has called out over 140,000 employees. This has materially affected sales in sections tributary to the strikers' region.

Season goods have been in active demand, largely owing perhaps to the fact that both shelves and floor space were starved to depletion on most lines of summer seasonable goods when the season of 1901 ended. Therefore, taken as a whole it has been a satisfactory month to the wholesale trade. The month of June is usually an active month, but how much trade will be affected from strike conditions at this writing can only be surmised, although there is a hopeful feeling throughout these districts that settlement may be effected during the month of June.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—The month of May was very satisfactory in every respect to the Hardware jobbers of this city. The sales were somewhat larger than for the corresponding month of last year, and covered a wider range of goods than usual. The orders received from the traveling men were numerous, and for very nice quantities and a great variety of goods. One thing especially noticeable about the orders received during the month was the fact that most of them were rush orders. Everybody who bought seemed to be in a hurry for the goods, and a number of jobbing houses had to work overtime in order to get the goods out promptly.

The crop prospects in Tennessee, Alabama and Mississippi are very fine. Corn and cotton are looking unusually good and promise to be one of the best crops in years. If nothing occurs to injure the growing crops trade in the South during the coming summer and fall will be very heavy.

Collections are reported to be most satisfactory.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—Business conditions throughout this section of the country continue to remain fully as satisfactory as outlined in our previous reports. The general prosperity that has marked the past three or four years is well maintained.

The volume of business transacted during the month of May has been fully up to expectations, and while the amount of business received to cover immediate requirements has been very large, the advance orders booked for later shipments are of such variety and extent as would indicate a run of business of large proportions later on.

The prospects for a heavy yield of grain are encouraging. Copious showers of rain have been general throughout the Trans-Mississippi country, and reports received from nearly all sections are of an optimistic character. General conditions are regarded as excellent, labor is well employed, and prospects for the continuance of a heavy volume of business appear to be very favorable.

New Orleans.

A. BALDWIN & CO.—Business has been fairly active during the past two or three weeks; in fact a little better than we anticipated. As we approach midsummer it shows a tendency to become quiet. The general conditions are very encouraging, and we look for a decided improvement about 30 days later.

The demand for Builders' Hardware is exceptionally noticeable.

NOTES ON PRICES.

Wire Nails.—Some falling off is shown in the demand for Wire Nails, which is not unlooked for at this season of the year. The trouble of getting prompt shipments from mill is becoming less. Differentials between jobbers' and retailers' prices are not always maintained on carload lots. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—The local demand for Wire Nails is good, and store business is referred to as satisfactory. The market is represented by the following quotations: Small lots from store, $2.30; carloads on dock, $2.18 to $2.20.

Chicago, by Telegraph.—Not a few of the Wire Nail mills have been able to catch up with orders and are now making relatively prompt shipments on orders received; the demand, however, continues to decrease, as is usual at this season. It is expected that there will be an accumulation of stock during the next few months, and to offset this tendency it is understood that a number of independent mills will reduce their output. It seems improbable that any reduction in prices would stimulate the demand at the present time, and even if such a step were contemplated the margin between Billets and Nails would deter any such action. The jobbing demand has been moderate and the market has remained steady. Single carload lots are selling at $2.20, and small lots at $2.25 to $2.30 from store.

Pittsburgh.—Since January there have been three advances in prices of Wire Nails, and most of the larger trade covered their requirements for some time ahead at prices slightly lower than are ruling now. Specifications on these contracts, with new business coming in, keep the mills fairly busy. Demand for Wire Nails usually falls off at this season, and this year has shown no exception. No change was made in prices at the meeting of the Wire Nail mills, held on May 29. We quote Wire Nails at $2.05 in carloads and $2.10 in less than carloads, f.o.b. maker's mill.

Cut Nails.—At the monthly meeting of the Cut Nail Association domestic prices for May were reaffirmed for the month of June, but export prices were advanced 10 cents per keg. Complaint is still heard regarding the scarcity of Nails. Those mills that make Steel Nails are unable to procure enough steel, while it is more profitable for those who are in a position to cut Nails to sell the puddled bar than to turn it into Nails. Demand is fair and the market is firm at the following quotations, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots	$2.05
Less than carload lots	2.10

New York.—The demand for Cut Nails in the local market is moderate. Quotations for carloads and less than carloads are as follows:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—The scarcity which has developed in Cut Iron Nails has strengthened the market materially, and there has been a fair demand, but prices have remained unchanged, small lots selling at $2.30 from store, but it is difficult to make prompt shipment.

Pittsburgh.—As was expected, May prices for Cut Nails for June shipment were reaffirmed. There is trouble in getting Iron Cut Nails, and the mills are urging buyers of these to substitute Steel Nails whenever possible. We quote Cut Nails at $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination.

Barb Wire.—While not so large as some time ago, the demand for Barb Wire is fair. The market is fairly firm in tone, and prices are represented by the following quotations, f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carloads	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carloads	2.80	3.10

Chicago, by Telegraph.—Barb Wire mills that have been oversold are gradually discharging such obligations, and it is now reported that reasonably prompt shipment can be made, but there is less demand. The market continues very firm, however, and full prices are obtained. Painted sells at $2.80 and Galvanized at $3.10 for carload lots, with 5 cents extra for small quantities.

Pittsburgh.—There is a fair volume of new business, but the mills are running mostly on old contracts. We quote as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—Contract orders for Plain Wire keep mills employed, while current demand is less pressing. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base				$0.40	extra.
10	$0.05	advance	over	base	.40	"
11	.10	"	"	"	.40	"
12 and 12½	.15	"	"	"	.40	"
13	.25	"	"	"	.40	"
14	.35	"	"	"	.40	"
15	.45	"	"	"	.75	"
16	.55	"	"	"	.75	"
17	.70	"	"	"	1.00	"
18	.85	"	"	"	1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—There seems to be a more ample supply of Plain Wire, the mills being able to make more prompt shipment, and there being a less active demand. The market continues very firm and prices are unchanged, jobbing lots selling at $2.20 from store.

Pittsburgh.—Demand for Plain Wire has fallen off a good deal, as it always does at this season of the year. The mills, however, have plenty of old contracts on which buyers are specifying liberally. We quote Plain Wire at $2 and Galvanized at $2.40 in carload lots, f.o.b. Pittsburgh. Slight advances are charged for small lots.

Diversity in Lists of Hickory Handles.—The wish has often been expressed that there was more uniformity or universality in trade lists of Hickory Handles for Axes, Picks, Sledges and kindred tools. One of the difficulties in the way of a universal list for Hickory Handles is that the trade is so different from that in other Hardware or allied lines. For instance, the undersized French Canadian wood chopper requires a peculiarly curved 28-inch Handle, while the Western Titan wants a different pattern and much longer. What the Briton insists on the African and Australian will not have. In this way the various quarters of the globe have come to specify certain styles and patterns which are entirely foreign to other sections, and one group neither knows nor cares nor wishes to be bothered with the necessities of the other. Thus a variety of lists have become fixtures in the trade, and each is sent to a customer, according to the market with which he is identified. For example, one portion of the United States—the West, South and Pacific section—has a certain list, the Eastern territory another, with still different lists each for Great Britain, Germany, France, Australia and Africa, and more recently still a separate list for South America.

Blind Hinges, Gate Hinges, &c.—The manufacturers of these goods have recently announced a further advance and the market is decidedly firm. The cost of raw material and the heavy demand are the factors which contribute to the strength of the situation.

Binder Twine.—There is not a large amount of activity in the Binder Twine market. Since initial orders were placed buying has been in limited quantities, presumably to cover sales made. Reports from some sections of the country show improved conditions of crops. It is believed by some manufacturers that there will be enough twine to supply all requirements. General quotations are as follows, f.o.b. New York, with ¼ cent per pound rebate in carload lots:

	Per pound.
Sisal	11 to 11¼
Standard	11 to 11¼
Manila	13½ to 13¾
Pure Manila	15 to 15¼

Cordage.—The trade are buying sparingly of Rope on account of high prices, allowing manufacturers to carry the stock. It is questionable whether many manufacturers could make prompt shipment of a well assorted carload. While the aggregate stock of a manufacturer may be large, the assortment may vary according to the demand, sizes not being made up much in advance of current requirements. Quotations for small lots are as follows: Sisal Rope, on a basis of 7-16 inch and larger, 10 to 10¼ cents per pound; Manila Rope, on the same basis, 13½ cents per pound, with ¼ cent rebate for large lots. Some Western jobbers are in a position to sell Rope below manufacturers' card prices and are quoting Sisal Rope at 9¾ cents per pound, base, and Manila Rope at 13 cents per pound, base.

Glass.—But a small quantity of Window Glass is now being made except at such factories of the Independent Glass Company that are in operation. At the meeting of the Federation Co-operative Window Glass Company, held at Columbus, Ohio, last week, the appointment of a wage committee was authorized who will be ready to meet a committee representing the skilled workmen, to take up the matter of wages for the coming fire. A paper devoted to Glass interests states that the American Window Glass Company are now and have for some time past been getting considerably better than 88 per cent. discount for their product. Eighty-eight per cent. discount off the manufacturers' list was supposed to be the price paid by the Jobbers' Association when they placed their last order in April of this year. The Jobbers' Association quotations are as follows:

	Discount.
From store, single and double strength	89 %
F.o.b. factory, carload lots:	
Single and double strength	90 and 5 %

Existing prices of Plate Glass were reaffirmed at the meeting of Plate Glass jobbers and manufacturers in Chicago last week. Eastern jobbers' quotations are 80 and 10 per cent. discount, f.o.b. cars.

Paints and Colors.—*Leads.*—There is not so large a number of new orders for White Lead in Oil being placed as during the recent past, but deliveries on contracts are fairly active. The indications are that the usual summer quiet in this line is beginning to show itself. Quotations are as follows: In lots of 500 pounds or over, 6 cents; in lots of less than 500 pounds, 6½ cents per pound.

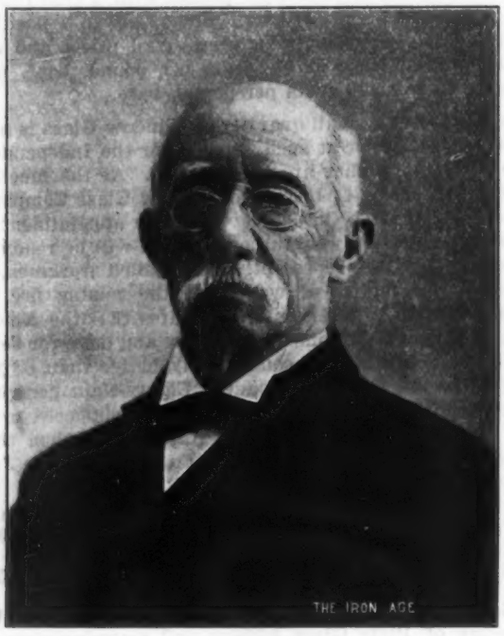
Oils.—*Linseed Oil.*—Contract deliveries of low priced Oil are being shipped by crushers. The contracts, it is understood, cover June and July delivery. Local demand is confined to jobbing lots, on a fairly firm market. It is reported to be easier to buy small lots than larger quantities at the lowest quotations. Quotations are as follows, according to quantity: City Raw, 66 to 67 cents; out of town Raw, 63 to 65 cents per gallon.

Spirits Turpentine.—The condition of the Southern Turpentine market continues strong, owing to the comparatively light receipts, which are reported as being about 12,000 barrels short for the first two months of the season, as compared with the same time last year. Demand at this point is moderate, buyers not being desirous of purchasing beyond immediate requirements at present prices. Quotations, according to quantity, are as follows: Southerns, 48¼ to 48¾ cents; machine made barrels, 48¾ to 49¼ cents per gallon.

DEATH OF PETER McCARTEE.

PETER McCARTEE, vice-president of the Stanley Works, New Britain, Conn., and manager of the New York branch of the company's business, died suddenly of heart failure, Wednesday, May 28, at his home in Brooklyn. Beyond a little indisposition during the day while at his office, which apparently yielded to treatment, there were no premonitory symptoms of approaching dissolution. Only that afternoon, accompanied by his wife and his brother's widow, a tombstone had been selected for his brother's grave. After dinner, not feeling well, he laid down. About 9 o'clock in the evening he complained of some difficulty in breathing, and, although two physicians were quickly summoned, he died 45 minutes later.

Peter McCartee was born opposite St. John's Park, New York, in the fall of 1828, and was the son of Rev. Robert McCartee, D.D., an able and honored clergyman of the Scotch Presbyterian Church, one of whose sons, Robert, died a few years ago, after a successful and honorable career as missionary to China. Coming thus of good stock and brought up in an



PETER McCARTEE.

atmosphere which cultivated refinement and moral worth, a basis was laid for his high character and for the usefulness and success of his life.

Peter McCartee's first connection with the Hardware trade was with J. K. Lawson, Newburgh, N. Y., in 1852, where his duties, according to his own description of them given a few years ago, included sweeping the store, making fires and handling Plow Castings. He commenced on $1 a week, remained there three years, and at the end of that time was getting $25 a month. The clerks had to stay at the store until the business of the day was finished, no matter how late it was—often until after 10.30 or 11 p.m.

After an apprenticeship in Newburgh he came to New York and was employed by Wetmore & Co. in their iron store on Washington street. After remaining there awhile he entered the service of Cornell, Willis & Carey, Hardware jobbers, at 36 Cortlandt street, opposite the old Merchants' Hotel, as a pick up buyer of Hardware, which in those days was a more important position than at present. He used to get to the store at 7 a.m., his first business being to examine the goods laid out on orders, then making a memorandum of shortages to be made good by purchases from the numerous large jobbing houses located in Platt, John and Pearl streets and Maiden lane, with a few on Beekman street, the goods bought being largely foreign. In this position he was paid $400 a year at the start, and at the end of three years was receiving $1200 a year. Sidney Cornell of this concern once remarked to a companion, referring to Mr. McCartee, "There goes the best clerk we ever had in our employ."

In 1857 Mr. McCartee was the representative in New York, at 52 Beekman street, of several New Britain manufacturers. This group or syndicate included Stanley Works, Stanley Rule & Level Company, Landers, Frary & Clark and Humason & Beckley Mfg. Company. Stanley Rule & Level Company established a New York office of their own in 1862, in charge of Thomas E. Gaynor, and later Landers, Frary & Clark opened a separate office under the supervision of John W. Clark. Following this tendency toward broader business lines, Mr. Beckley soon established an office in charge of V. P. Humason. Peck, Stow & Wilcox Company came in soon after Landers, Frary & Clark dropped out of the combination, which then consisted of the Stanley Works, Peck, Stow & Wilcox Company and Humason & Beckley Mfg. Company. Finally all the others drew out and for the last 25 years Mr. McCartee had represented the Stanley Works exclusively.

During the period referred to, however, this office was also the New York headquarters of Sheble & Fisher, afterward Sheble & Klemm, manufacturers of Forks, Rakes, &c., as well as the Shovels, Scoops, Spades, &c., made by T. Rowland's Sons.

Mr. McCartee was vice-president and a director of the Stanley Works for 15 years. He was a member of the New Britain Club, and among the most prominent of the founders and organizers of the Hardware Club of New York, of which he was one of the incorporators, a governor from its inception, and president for three full terms and the unexpired portion of the term of William H. Williams, the first president of the club, who died in August, 1895.

The accompanying portrait of Mr. McCartee is from one of several photographs recently taken for the use of an artist in painting a portrait in oil to hang in the directors' room of the Stanley Works in New Britain.

No Hardwareman in New York was more generally known than Mr. McCartee, and he had a host of friends. He traveled very little, preferring to be at home near his family, who were especially dear to him. It was a rare event for him to be away from home over night. While his position as a New York merchant did not require his calling upon the trade throughout the country, he had an extensive acquaintance among prominent Hardware merchants. Thirty-five or 40 years ago a New York agency meant more than it does now. Then merchants visited the city from all sections to buy goods, and Peter McCartee was known and trusted by them all. This acquaintance was kept up in good measure in later years, especially as he was endowed with a rare gift for hospitality and delighted to meet and entertain his friends when in the city.

As a business man, Mr. McCartee was characterized by energy, good judgment, strict integrity, and a geniality which made a host of friends. Among his strong characteristics was his faculty for winning and retaining customers by persistency and fidelity of attention, coupled with a genial manner and an attractive personality. It is said that he made no enemies. In latter years he was familiarly known as "Uncle Peter," especially by the younger men. He retained up to the last much of the vivacity and buoyancy of spirit of early years, and was as active as many men of 50.

He was a public spirited citizen, and all through his life was interested in benevolent and religious activities. He occupied for many years the office of deacon in the Church of the Pilgrims, of which Rev. Richard S. Storrs, D.D., was for more than 40 years the pastor. Mr. McCartee also conducted in this church a large and successful Bible class.

The funeral services were held Saturday afternoon, May 31, from the Church of the Pilgrims, the interment being in Greenwood Cemetery. There was a large attendance of friends and business associates, together with a representative delegation from the Hardware Club, the following being the members appointed by

the president, E. C. Van Glahn, most of whom were present: George Munson, William G. Smythe, Terence F. Curley, Gustav Vintschger, Charles Putzel, William A. Graham, Frank M. Brooks, William Bishop, S. Otis Livingston, William F. Schlemmer. Hobart Weed, Robert K. Carter, Franklin Acker, Howard Rowland, Edwin Haviland, E. P. Stoughton, David Williams, Henry R. Towne, Edward Stagg, Joseph Gales, George H. Sargent, Robert Sickels, M. C. Ogden, Eugene Bissell and R. R. Williams.

Mr. McCartee is survived by a widow, one son and two daughters.

The sincere and widespread sorrow with which the tidings of his death were received and the many appreciative tributes which were paid to his kindly qualities and sterling worth indicate the exceptional respect and the unusual affection with which he was regarded by a multitude of friends, not only among his business associates, but in wider circles, in which his attractive personality and his high character secured for him an enviable estimation.

EXPANSION BOLT CONSOLIDATION.

IN regard to the combination of the manufacturers of Expansion Bolts, announcement of which was made in these columns a month ago, we have been informed that options on various plants have been quietly taken during the past few weeks in the interest of a Baltimore, Md., syndicate. M. Harper Steward of Philadelphia, who was instrumental in obtaining the various options, advises us that the parties for whom he acted were desirous of forming a company on as low capitalization as possible and to base same on the amount of Bolts sold during the past two years and the value received from same. It is hoped that satisfactory arrangements can be made with the various manufacturers, as the mere fact that six or more companies under one head would decrease the cost of manufacture, and with a decrease of 10 per cent. in the discounts, it is expected that profit enough to declare a fair dividend will be made. Among those who have given options on their plants, either on a straight cash or cash and stock basis, in the new company are: Isaac Church, Toledo, Ohio; McCabe Hanger Mfg. Company, New York; D. C. Seaman & Co. and the Steward & Romaine Mfg. Company, Philadelphia, Pa., and the Phipps Mfg. Company, New York. It is expected that options will be closed with several others at an early date, after which the plans for the formation of the new company will be made.

UNION METALLIC CARTRIDGE COMPANY'S NEW CATALOGUE.

THE UNION METALLIC CARTRIDGE COMPANY, Bridgeport, Conn., and 313-315 Broadway, New York, have just issued a price-list of 79 pages illustrating and describing Metallic Cartridges, Empty and Loaded Shells, Primers, Gun Wads, Percussion Caps, Brass Shot Shells, &c., and Ammunition for rapid fire guns, being a complete list of everything they make. Particular attention is called to the change in the name of the Smokeless Loaded Shell, which is now known as the Arrow. On page 4 of the catalogue is an itemized list of new Cartridges, catalogued for the first time. Most of these new goods are Smokeless Powder Cartridges. In the category of Empty Paper Shells the Challenge Shell has been so changed as to take a No. 3 primer with battery cup, instead of a No. 5 primer, as heretofore. Among the Loaded Shells the Tournament Loads, with different kinds of powder, which were not listed in last year's catalogue, are now given in considerable variety. It will also be noticed that all Shells made for smokeless powder, whether empty or loaded, have the famous U. M. C. No. 3 Primer with battery cup.

J. G. Thrall, dealer in Sporting Goods, Gloversville, N. Y., has formed a partnership with Irwin L. Annable, under the style of Thrall & Annable, and the new firm will add a full line of General Hardware to the present stock, continuing at Mr. Thrall's present location.

CONSOLIDATION OF MANUFACTURING INTERESTS.

IN view of the interest which the general subject of consolidating manufacturing concerns possesses at the present time the following views, expressed in a recent interview by Samuel Disston of Henry Disston & Sons, will be of value, especially as narrating the experience of the company in this connection:

Concentration and consolidation of business interests and enterprises are the culmination of events which have for some years past been "casting their shadows before," and the result of industrial and commercial conditions of the present time.

Most all branches of business have followed the trend of the times and effected a concentration in some form or another.

The primary object of industrial and commercial consolidation is economy—to produce goods at less cost, to market them at the least expense, and sell to the consumer at a reduced price. To corner the market and advance prices is not the end desired or attained.

The last consolidation attempted, that of the large Hardware jobbers of the United States, was not successfully concluded for reasons known only to those most concerned.

Had such a consolidation been accomplished, it would have affected to some extent the manufacturing Hardware houses, which in turn would have to adjust their business to meet the new conditions.

The writer well knows that consolidation as a rule results in reduced prices to the consuming public. Henry Disston & Sons to-day control at least 13 factories that at one time were in separate operation, and have not advanced prices since 1868, but on the contrary, their products are obtained by the user for less money and with the quality improved. The size of the establishment permits the constant employment of men upon one line of goods, who become proficient and expert, thus producing in larger quantity and better quality and earning better wages. In a smaller concern in the same line the workmen could not be steadily employed on one particular class of work, but would have to be changed around from one to another, thus lessening the quantity turned out and affecting the quality of the workmanship.

Disston goods are sold at the low price they are to-day for the reasons stated above, and the object of consolidating the factories was to reduce prices to the consumer rather than advance them, and in so doing the company believed that consolidation was to the true interest of all concerned.

Even during all the "boom time," so to speak, no advance was made in their prices, a position they could not have maintained had they been a small concern unable to provide themselves with material to carry them over the time.

In the opinion of the writer, had those in charge of the promotion of the consolidation or merger of wholesale Hardware houses proceeded with this thought and along this line, the project would have succeeded, and would have been a benefit to the public at large. The time, however, may come when the ideas of the present generation will be an inspiration for the future, and the attempted merger accomplished. Should that time arrive, we advise that economy be the keynote.

The benefit of large establishments to the community in which they are located should not be overlooked. In dull times they can keep their hands employed working on stock preparing for brisker trade.

Never during an active business career of 52 years has the writer seen the Disston factory absolutely closed down for want of business. The nearest to a total suspension in the company's experience was during the panic of 1857, when the plant was run two days a week.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, Hastings House, Norfolk St., London, W. C.

The Week's Hardware Trade.

THE arctic weather experienced here during the Whitsun holidays induced large numbers of workmen to return to the factories earlier than usual, with the result that the output during Whitsun week has been larger than for some years previous. There is, however, but little pressure, and trade now does not compare with the same period last year. While the heavy departments of the iron trade are unusually busy and ironmasters have their works going full time, there is distinct weakness in the allied or dependent industries, such as general iron foundry and iron plate working trades. The stiffening of copper prices has had a beneficial effect and has induced improved conditions in the brass and copper tube, sheet and wire trades. The price of copper on May 15 was £54 10s. (G.M.B.'s and standard copper), an advance of £2 10s. on the previous fortnight, but £15 under the price obtaining last year. From the manufacturing point of view the price last year was too high, and recently the unsettled condition of the copper market has had evil effects. But if the price can be maintained at about £54 10s. it cannot fail to have a steadying influence. There is a fair volume of trade in the Hinge, Gas Fitting and Electrolier branches, while, as I reported last week, Metallic Bedsteads, both of brass and iron, are in good request, although prices are badly cut. Railway material is being ordered in large quantities for India, South Africa and South America. The Railway Carriage and Wagon works are all well employed and prospects here are good, particularly in view of the long hoped for termination of hostilities in South Africa. Carriage Axle manufacturers are also happily situated, both for the home and foreign trade. This business has, of course, been stimulated by the preparations for the coming coronation. The feature of the Cycle trade is that there is but little demand for high-class Cycles, but Cycles of the poorer grade are being sold in large quantities, the demand for them among the working classes being strong. However, most of them appear to have made their purchases prior to Whitsun, as since then there is a distinct slackening. Good orders from South Africa and Australia for Cycles have been received, so that, taking one thing with another, the Cycle trade is doing fairly well. The Britannia metal trade is dull, but electro platers are busy not only on Spoons and Forks and other Table Ware, but case goods and presentation Cups suitable for athletic and agricultural prizes. The route in London over which the coronation procession will pass is being covered thick with enormous stands, and this has led to a brisk demand for Cut Nails, Joiners' Brads, &c. This demand, however, is quite special and in the country may be best described as languid. The building trades throughout Great Britain have been hard hit by bad weather and by financial considerations due to the war, and Builders' Ironmongery and Carpenters' Tools have, of course, been affected. In like manner the unfavorable weather has temporarily checked orders from seaside resorts. There is a good demand from Cuba, notwithstanding recent political events there, and large orders have been promptly placed for the West Indian Islands for Structural Material and Tools to repair the damages caused by the recent terrible volcanic outbreak. There is also a distinct increase of activity in orders from Australia and New Zealand, while South America has recently sent out some good indents. The producers of Naval Ironmongery are filled with orders, while Galvanized Roofing Material, Edged Tools and Horseshoes are in heavy demand. Japanners and stampers are doing an even larger business than I have previously reported, and the Tube trade is also looking up. The Cutlery trade of Sheffield is working back from bad times toward the average. A variety of best quality Cutlery has been ordered for use during the coronation, and the same remark applies to the Ivory and Pearl trades. But while the London market thus shows slight improvement, there is very little weight of goods going from Sheffield to provincial towns, and general surprise is expressed that the coronation festivities have produced so little wholesome effect on trade output.

Australian Platinum.

It is known that platinum is plentiful in New South Wales, although the quantities at present obtained are limited, the output in 1900 being only 530 ounces, valued at $5000. The total quantity raised since 1894 amounts to 8295 ounces, valued at $62,000. The great difficulty is the scarcity of water in the districts in which the metal is found. When this obstacle has been overcome prospecting operations on an extensive scale will be possible. The metal is met in a native state alloyed with iron, iridium, osmium and other rare metals. It usually occurs in grains or scales, sometimes in irregular lumps or nuggets, and rarely in crystals. A cubical crystal of platinum found at Fifield, now in the Sydney Geological Museum, measures nearly 3-16 inch. The only other form in which platinum is found is that of an arsenide in the mineral sperrylite, which occurs in minute cubes or cubo-octohedral crystals, which have a tin white color and black streak. Although the existence of platinum in New South Wales had been suspected for many years, its actual discovery in payable quantities dates so recently as 1893, and it is probable that as fresh discoveries are made an extensive and valuable branch of the State mining industry will be created. The New South Wales platinum is obtained chiefly from the Fifield district, about 322 miles west of Sydney, where it is found associated with gold. Here the principal workings are at Platina, a township situated about 2 miles from that of Fifield, a deep alluvial "lead," containing platinum and gold, extending from near the former place for over a mile in length and varying fom 60 to 150 feet in width. The sinking is from 60 to 70 feet, through loam, with some bands of barren quartz drift. The platinum and gold occur in fairly coarse water worn grains and, as a rule, are confined to the cavities in the bed rock and to the wash dirt for a few inches above it. Occasional nuggets of platinum have been obtained; the largest hitherto found weights 27 dwt. and was purchased for the Sydney Geological Museum. There are two other nuggets in the Museum weighing 11 dwt. and 8 dwt. respectively. The wash dirt contains from 5 dwt. to 12 dwt. of platinum and from 1 dwt. to 3 dwt. of gold per ton. The yield from 269 loads, taken from a number of claims along the "lead," was at the rate of 6 dwt. 21 gr. of platinum and 1 dwt. 23 gr. of gold per ton. Platinum has also been found in the Broken Hill district and in many other places; likewise on the beaches of the northern coast, where it is obtained from the auriferous sands. Here the gold, platinum, &c., which are concentrated on the beaches during stormy weather are brought down by the action of the waves from an ancient beach deposit, which occurs at an elevation of about 6 feet and which has received the name of "black rock" locally. This consists of a layer or bed of black sand rock, composed chiefly of small zircons, with some grains of ilmenite (titaniferous iron), quartz, garnet and tin stone, and also small but variable proportions of platinum, platinoid metals and gold in a very finely divided state. The black color of the sand rock is due to organic matter, probably derived from swamp vegetation. The ultimate source of the precious metals is not known, but it is probable that before being deposited in the black rock they existed in a detrital state in a tertiary quartz pebble drift, which occurs, under basalt, along the coast and which has undergone a considerable amount of denudation.

British Gunmakers and Foreign Competition.

The Birmingham Gunmakers' Union have decided to send a deputation during the summer to Belgium and France with a view of obtaining practical knowledge as to the conditions of production and labor in those

countries. It is hoped that the information thus acquired will prove of great value in meeting foreign competition. As the secretary of the Gunmakers' Union will be one of the deputation, the inquiry will be conducted both from the point of view of the employer and employed. The men's secretary, speaking of the proposed inquiry, says:

"It is admitted that the home worker cannot be brought down to the level of the foreigner. We in Birmingham could not live on the wages obtained in Liège. Rents are so much lower out there, and the workers are inclined to cheaper habits and harder work. One knows these things from hearsay, but what we want are facts discovered by ourselves. I am pleased to say that the Birmingham manufacturers are likely to help us, though we are carrying out the scheme on our own initiative and at our own expense."

It is proposed that a seven days' visit be paid to the Continent and that the deputation shall consist of two, while it is expected that other men will also take the opportunity of traveling with the two.

Wolverhampton Municipal Rates.

It is of course well known to American readers that Wolverhampton, next to Birmingham, is the greatest Hardware producing center in Great Britain. Unfortunately the municipal rates of Wolverhampton are excessively high, and they have again been advanced. The burden is being severely felt by Wolverhampton manufacturers, and it is said they will be driven into places where the expense of carrying on business will be lighter. John Marston & Co., the well known Cycle manufacturers, are talking of removing their plant to Coventry. At Coventry, in the assessment of Cycling works, the aggregate power of the small machines—which are very numerous in such an establishment—is rated, no matter how many different kinds of machines there may be, the driving power being the basis, but at Wolverhampton all the small machines are taken into consideration and each estimated according to its power. The result is considerable friction. Apart from the municipal rates, railway freight rates are also a serious obstacle in the way of export trade. It is only a year or two ago that the firm of Nettlefolds had to move to the seacoast, and a little later John Lysaght, Limited, also removed their factory from this district to South Wales. American manufacturers have certainly an advantage over their English competitors so far as city rates are concerned.

The Morocco Trade.

I am never tired of directing the attention of American exporters to the Mediterranean trade. Greece and Turkey can take a great quantity of Hardware and metal goods, particularly agricultural implements, both light and heavy. In addition, Egypt is waking up, and the northern coast of Africa is gradually approaching to European habits. Morocco is one of those countries on the north coast of Africa which is slowly coming under European influence. The districts of Morocco may be roughly described as Tangier, Tetuan, Fez, Larache, Dar-al-Baida, Rabat, Mazagan, Saffi and Mogador. In the district of Tangier there is an improving demand for Hardware. Last year the principal items were Lamps, $2080; Nails, $3115; Buckets, $2600; Iron Pipes, $3360, and Iron Beams, $10,045—all these came chiefly from the United Kingdom; Iron Bars, $8250, from Belgium, France and the United Kingdom; Wire, $7230, from France and Belgium; Ironmongery, $10,210, from Belgium and France; Sewing Machines, $3685, from the United Kingdom and Germany; machinery, $5345, from France; and Steel, $5575, from France, Belgium and the United Kingdom. Into the port of Tetuan last year was imported 210 packages of Hardware valued at over $3000, 3650 cwt. of Iron valued at $4200, and 316 cwt. of Steel valued at $1200, in each case an increase being observed on the preceding year's trade. The port of Larache also bought Hardware, Hollow Ware, &c., to the extent of 940 packages valued at close on $10,000, Iron, Steel and Nails to the extent of 6376 cwt. valued at $19,000, and Guns, Ammunition, Machinery, Electrical and Railway Furniture, &c., for the Sultan to the extent of $50,000. The imports into the district of Dar-al-Baida showed increased purchases of Hardware, Iron and Iron Ware, chiefly from Germany and the United Kingdom. There is here a good demand, both for Hollow Ware and Cheap Cutlery. The port of Rabat indicates precisely the same drift of trade. The imports into Mazagan include 560 boxes of Tin Plates. Mogador is also a thriving district, purchasing 199 tons of Hardware, 387 tons of iron, 60 tons of steel and 247 cases of tin plates. I imagine it might be worth while to secure an agent either at Tangier or one of the other ports of Morocco, for this trade will undoubtedly increase as the years roll on.

South American Trade.

A gentleman writing from Montevideo gives a number of interesting particulars relating to the foreign trade of Uruguay. After referring to the commercial depression which was a marked feature of this country all last year, he proceeds:

> Fortunately, I am able to add that the current year already shows signs of decided improvement in the exportation, though the recovery is not perhaps quite so great as was anticipated three or four months ago. It is worth noting that since 1891 the exports of the Republic have steadily exceeded the imports by amounts varying from $4,000,000 last year to as much as $11,000,000 in 1899 and nearly $2,000,000 in 1894 and 1897. In round figures the exports for the 11 years 1891-1901 reach $330,000,000, as against $249,000,000 for imports, a difference in favor of the former of $81,000,000, or some $7,300,000 yearly average. This "balance of trade," which may really be called enormous for so small a country, more or less represents the drain on its resources to meet the heavy service of the public debt, the result of many years of extravagant and corrupt government.

Turning from Uruguay to Argentina, I observe that the value of imports into the Rosario Custom House for the year 1901 showed a marked increase in Hardware, Agricultural Implements, Building Materials, Paints, Oils and Metal Wares, the figures being: Hardware and Agricultural Implements, 2,743,789 gold dollars; Building Materials, Paints, Oils, &c., 2,115,801 gold dollars, and Metal Wares, 136,724 gold dollars. Exporters have little difficulty in securing the services of reliable agents at this port, for there are a number of good brokers who have an intimate knowledge of the requirements of this market. It is, of course, needless to remark (and yet I do it) that price-lists and catalogues are quite worthless unless in the Spanish language, while prices and measurements must be quoted in the decimal system. Samples of merchandise, subject to a deposit in the custom house in accordance with their value, may be introduced free of duty. The deposit exacted can be recovered when the samples are reshipped. Last year I reminded exporters to the Argentine that it was important for them to protect their interests by registering in Argentina any trade-marks to which they attach any value. As showing the distribution of the foreign trade of the district of Rosario among the various countries, the following tabular statement may prove of value:

	1900.		1901.	
	Imports. Dol., gold.	Exports. Dol., gold.	Imports. Dol., gold.	Exports. Dol., gold.
United Kingdom	3,091,542	6,729,133	3,814,908.59	7,188,986.58
United States	2,194,843	3,298,202	2,542,911.10	4,039,861.52
Germany	1,106,187	3,321,482	1,227,114.95	2,921,330.75
Italy	1,496,525	114,619	1,596,285.21	51,944.57
Belgium	297,865	799,289	565,024.31	928,939.51
Spain	141,284	408,634	138,187.17	641,658.72

REQUEST FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

S. J. Thomas, Gainesville, Fla., wholesale and retail Hardware, Farming Implements, Turpentine Supplies, &c., has taken up the Mill Supply business, and will appreciate catalogues, quotations, &c., relating to this line.

Wm. Parkinson, Madison, Neb., has disposed of his business to the Hume-Robertson-Wycoff Company, who will continue the wholesale and retail Hardware, Stove, Tinware, House Furnishing Goods, Glassware and Plumbing and Heating business at the old stand.

ECHOES OF THE CONSOLIDATION COLLAPSE.

BY A WESTERN MERCHANT.

THE collapse of the wholesale dealers' trust is both instructive and amusing. For more than a year a merry joker has been traveling up and down the country holding out golden offers to every jobber for his business. At last, with a flourish of trumpets, the business world is informed that the gigantic task has been accomplished of uniting in a solid trust 50 of the largest Hardware jobbers in the United States, controlling two-thirds of the trade of the country, with a head at St. Louis, an arm at Pittsburgh, another in Philadelphia and two feet in New York.

"All the world wondered."

Then *The Iron Age* gave us a list of the houses composing this happy family, and the wonder increased. Some of these houses had a half or a quarter century history, and that they should be willing to obliterate themselves from the business directory of the world seemed noteworthy, as well as surprising.

Fooling Itself or the Public.

The capitalization at $120,000,000 occasioned little comment other than good natured joking. No one nowadays expects capital stock to have any connection, apparent or otherwise, with the property it represents.

There is a hazy idea in many minds that preferred stock may mean actual value, but common stock is universally believed to represent nothing but bait with which to catch suckers. But in this case men of good judgment wondered if the $40,000,000 preferred stock meant that the trust was fooling itself, or was simply expecting to fool the public.

The stocks of the 50 concerns were pretty well known to the large army of traveling men, most of whom are very shrewd judges of values, and the reports of Dun and Bradstreet were available to show what these houses claimed their stocks to be worth when no trust was in sight. No basis could be found for putting a value on 50 stores of even one-half the $40,000,000 of preferred stock.

Arguments Pro and Con.

Now followed the arguments pro and con as to the wisdom and effect of this move. One said, with owl like wisdom: "It is in line with commercial economics to sell goods only from natural distributing centers and to reduce the number of houses at those centers to as few as possible."

But another asked: "How do you know that the number of houses will be reduced?" And another asks: "As Chicago is a much more favored and 'natural distributing center' than St. Paul, will the trust close up its St. Paul branches and let the trade go to Chicago, where it has no branch?"

Manufacturers began to use the famous phrase of the Georgia statesman and ask: "Where are we at?" They were each afraid that the great octopus would draw it into its mouth, and at the same time they were equally afraid that it would pass them by. Just as they had fully determined to say "No" to any overture and mean "Yes," *The Iron Age* prints a leaded item of a few lines saying, in effect, that the whole thing has gone to the "demnition bow wows," and is only a matter of amusing history. Great was the fall thereof!

And now we are having the various explanations, good, bad and indifferent, as to why the bubble burst. One of these says the reason he was ready to sell out was because the wholesale business was so good, "doubling in the last five years." Perhaps the increase is between what his stock was really worth and the price the trust was expected to pay him for it! Probably 50 stocks "doubled" in this way in the last few months, and now, sad to relate, they drop back again to their old value.

Questions for the Retail Trade.

The relation of the wholesale dealer is not changed by the breaking up of the proposed trust. On the contrary, it started questions that are now being considered by the retail trade of the country, and will be more and more thought over before next winter's State conventions. One of these is: What toll are we paying to cross the wholesale dealer's bridge?

Turn to the item on page 56 of *The Iron Age* of May 22, under the head "Earnings of Jobbers." It is said that the net profits of Eastern jobbers for the past few years were 6 per cent., while Western jobbers have made 15 to 25 per cent.

Why are the profits of the Eastern jobbers so small? Because the Eastern retailer is in close touch with the manufacturer; he is not only near him in miles, but he is close to him in business relations, and yet such goods as he buys cost him 16 per cent. toll; for the jobber's expense of doing business is 10 per cent., at least, and his profit is 6 per cent.

The Western jobber is more fortunate in having his trade further from the factories, and we are told that the recent move for consolidation showed that his profit is 15 to 25 per cent. net. As his expenses are 12 to 15 per cent., the Western retailer may consider that he is paying a toll of 25 to 40 per cent. to the wholesaler.

The line between East and West is a movable one, and retailers and manufacturers are drawing closer together. Factories are springing up in the Middle West and are giving the trade in their section the same advantage their brethren have in New England and nearby States.

Why the Jobber Is So Prosperous

The claim made by one of the disappointed 50 who did not sell out, that the wholesale Hardwareman is making money during this present business boom, is undoubtedly true; if not, it is his own fault. When the manufacturers of Builders' Hardware met a few weeks ago and advanced prices 20 per cent. they made the wholesaler a present of that amount on his stock of those goods. It is very easy to figure a profit when goods are going up if no allowance is made for the day when the turn comes.

The peculiar feature about the existing boom is that the retailers of the country have steadily refused to speculate by buying against a supposed advance. The jobbers have filled their shelves with goods, and at every little advance have said: "See how much money we are making!" but the retail trade have simply replied, "Perhaps."

Not so very far in the future a day will come when the wholesaler will be unloading with all his might. He will have no orders for the manufacturer, who will have to seek the retailer again to keep his machines going, and every step in that direction is a step forward and toward an end that is inevitable—the elimination of the wholesaler.

LUFKIN RULE COMPANY.

LUFKIN RULE COMPANY, Saginaw, Mich. (Eastern branch under the supervision of H. G. Hollis, 280 Broadway, New York), have just purchased the entire Tape business, including stock and machinery, of the Waterbury Brass Company, Waterbury, Conn. These goods will in a short time be available at the New York address of the Lufkin Rule Company, when they will be prepared to execute orders for this line of goods up to the limit of stock. The Lufkin Rule Company have just brought out a fine machine graduated steel Rule, the features of which are based on the metric system, the bill for the legalizing of which, so far as this country is concerned, is now pending in Congress and is thought to be sure of passage at this session. The Rule is 1 mm. thick, 1 cm. (about 13-32 inch) wide and 1 dm. (about 3 15-16 inches) long. On one side it is graduated in millimeters, 100 of which make the decimeter or entire length of the rule. The rule is put up in a leather, metal bound, case.

THE Board of Directors of the Minnesota Hardware Dealers' Mutual Fire Insurance Company have elected the following officers for the ensuing year: C. F. Ladner of St. Cloud, president; J. F. McGuire of Minneapolis, vice-president; T. H. Hauser of Minneapolis, treasurer, and M. S. Mathews of Minneapolis, secretary. The treasurer's report showed a surplus of $20,000.

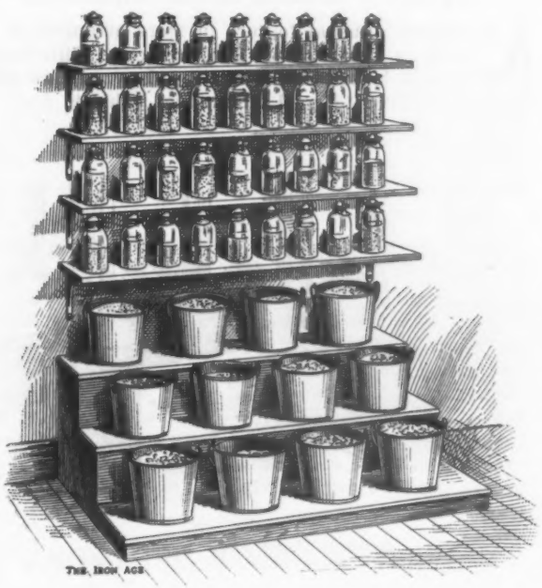
A CLEVER AND PERSISTENT SWINDLER.

TWO or three months since we warned the trade against a clever rogue who has been working the trade, principally manufacturers, for considerable sums of money on a loan or advance basis. Our attention at that time was called to the matter by A. Baldwin & Co. of New Orleans, the swindler representing himself as a member of that concern, and using the name Baldwin in connection with various initials. From advices just received from a Buffalo manufacturer the same individual is apparently still operating successfully and profitably. Our Buffalo correspondents advise us that he introduced himself to them as a prominent merchant of the Northwest, and give the following personal description of the sharper: Hight about 5 feet 10 inches, weight about 160 pounds, with black hair, sharp black eyes, face slightly pitted from smallpox, not enough to disfigure, but just enough to show that he has had the disease; has a set of false teeth in his upper jaw, some of the teeth being gold filled; has a black mustache clipped short, an inveterate cigarette smoker, as shown by fingers on the right hand, which are badly stained; a good dresser and a very fluent and interesting talker. It is to be hoped that some one of our manufacturing friends will bring the picturesque career of this interesting character to a close at an early date.

KEEPING SEEDS IN BOTTLES AND PAILS.

IN many parts of the country seeds are carried each spring as a regular line in the Hardware stores. It is essential that they be kept clean and free from dust and dirt, while at the same time they should be so placed that they can be seen by customers, and be of easy access for the clerk.

The plan employed by Smith & Bishel, Middletown, Conn., is shown in the accompanying illustration. Four shelves are fastened to the side wall of the store with ordinary shelf brackets, and on them are placed covered



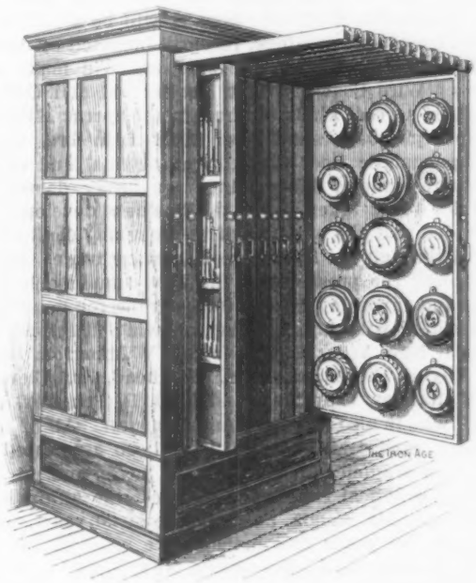
Seeds in Milk Bottles and Galvanized Iron Pails.

milk bottles, in which the Seeds are kept, of which the smaller quantities are sold. The covers keep dust out of the bottles, and the glass permits customers to examine the Seeds without handling them.

Below these shelves is placed a platform such as is shown in the illustration. On this are placed Galvanized Iron Pails into which are placed Seeds that are sold in considerable quantities. The milk bottles and Pails are taken out of stock, and not being injured by this use may be sold again as soon as the Seed season is over. The same shelves and stand are used in the fall for exhibiting Cartridges, in the early winter for Skates and at other seasons for other goods.

SLIDING DOOR SAMPLE CASE.

TAYLOR BROS. COMPANY, 85 Chambers street, New York, manufacturers of Thermometers, Barometers and kindred goods, have in use sample cases like the one shown in the accompanying illustration. The cases are of polished oak, with bases 18 inches high. In hight they are 8 feet over all, 3¼ feet deep by 4 feet wide. Each case is supplied with a number of sliding doors, with faces varying in width from 2_{72} to 4 inches, thus providing sufficient depth to accommodate goods of different



Sliding Door Sample Case.

thickness. The doors are 6 feet high and 3 feet deep, suspended by trolley wheels and track. The tracks extend to the extreme back of the case, braced on heavy beams, and protrude 3 feet beyond the front of the case, allowing the entire surface of the doors to be exposed when pulled out. Each door is capable of sustaining in the neighborhood of 200 pounds of goods. The goods are hung on square shouldered brass hooks. The construction and arrangement of the case is economical of space, besides permitting an entire line of goods to be shown to a customer at once. If a closer inspection or comparison of the goods is desired, they can be readily taken from the hooks and laid on a table, where their merits can be thoroughly explained. It is obvious that cases of this kind could be made for other kinds of goods, possibly embodying modifications to adapt them to the requirements of different lines.

BEALL SHOVEL COMPANY, Alton, Ill., advise us that they have all their machinery for making Antrim or strap pattern goods ordered, and they expect its arrival in about two weeks, at which time it is hoped their new building will be completed. The company expect to make about 60 dozen plain back or Antrim pattern Shovels per day. Since they began making hollow back goods about ten months ago they say they have had a heavy demand for the plain back or Antrim Shovels, and have orders on their books amounting to between 2000 and 3000 dozen for September 1 shipment. Business with the company has been good from the start and they are now away behind on orders, especially for Grain Scoops.

WEED & Co., Buffalo, N. Y., against strong competitors, have been awarded the contract for the Iron and Steel construction work on Machinery Hall, at the St. Louis World's Fair. Machinery Hall will be the second largest building on the exposition grounds. It will be 1000 x 500 feet, and its cost will aggregate $500,000.

THE VAN WAGONER COMPANY.

THE VAN WAGONER COMPANY, American Trust Building, Cleveland, Ohio, who were incorporated some months since, with an authorized capital of $750,000, expect soon to be in a position to put some of the goods which they are intending to manufacture on the market. Since December last special machinery has been under construction which is nearly completed, and dies, tools and adjustments have been and are being made. A well situated factory on Perkins place, in Cleveland, has been leased for a term of years. The principal product of the company will be a ball-bearing sheet metal spring Hinge, recently invented by Mr. Van Wagoner. In addition, the company will make a full line of Wire Coat and Hat Hooks, Rod and Coil Door Springs, several kinds of sheet metal Spring Hinges for various purposes, sheet steel Blind Adjusters, a liquid and pneumatic Door Check of an original and effective character, and a Floor Hinge for heavy doors, other articles being taken up as the business develops. It is intended that the products of the company shall be marketed through the legitimate Hardware trade. Mr. Van Wagoner, the president of the new company, has been well and favorably known to the trade for many years. Associated with him are the following directors: A. A. Fonda, New York; E. B. Waples, Wilmington, Del.; E. E. Allyne, Cleveland; F. A. Brodhead, Jr., Cleveland; E. C. Ranney, Cleveland, and L. D. R. Pomeroy, Cleveland, who is also secretary and treasurer. All of the directors, except Mr. Waples, have been associated with Mr. Van Wagoner for from 9 to 20 years, and are qualified by practical experience to direct the affairs of the company. Mr. Fonda, an associate of 20 years, will introduce the goods and manage the sales in the East, with an office at 253 Broadway, New York. L. F. Blue, who has an extensive acquaintance with the Hardware jobbing trade throughout the country, and who has successfully marketed various new articles of Hardware, will market the product of the company outside of Eastern territory. Mr. Pomeroy, who has had large experience in inventing and developing articles in Hardware, and who is an expert in designing and adapting mechanical advantages and economies in manufacturing, will have charge of the manufacturing department.

ROCHESTER STAMPING COMPANY.

ROCHESTER STAMPING COMPANY, Rochester, N. Y., have increased their capital stock from $300,000 to $500,000, in order that they may to better advantage handle their rapidly growing business, which now covers the entire country, as well as considerable foreign ground, including German, English, French, Australian, South American and African clientage. The company are at present employing about 500 hands, with 44 salesmen on the road, and are running two factories full time. They have recently been obliged to equip a second factory, and also build a new storage warehouse. All the capital stock is held by the original stockholders, none of it being offered outside. The company are looking for a very satisfactory trade this fall, as there seems to be a growing demand for the goods of which they make a specialty.

SARGENT & CO.

SARGENT & CO. are about to begin extensive additions to their large plant at New Haven, Conn. One of the projected new buildings will occupy the block on Water street, between Wallace and East streets, and will be 305 feet long by 50 feet wide, five stories in hight. Another building of about the same dimensions will be erected adjacent to this structure. Their six-story Lock finishing shop on Wallace street, which is now 200 x 56 feet, will be extended 100 feet to Water street, and thence along Water street to East, the frontage on the latter thoroughfare being 305 feet. An addition of 151 feet will also be made to their iron foundry. These enlargements to one of the most extensive and complete Hardware factories in the world will provide for a substantial addition to the already large force of employees.

THE ADVANTAGE OF CONSOLIDATION.

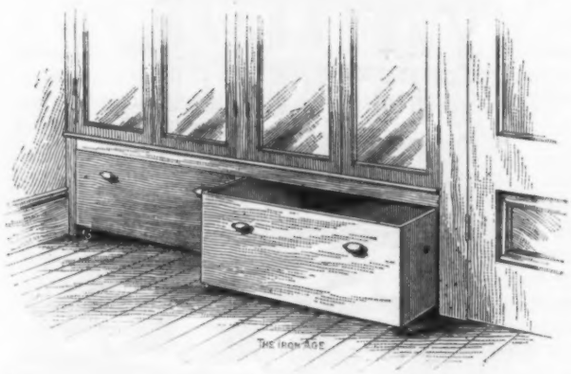
IN view of the fact that many manufacturers look with more or less question upon the desirability of consolidation, even in manufacturing lines, the following communication from a Massachusetts manufacturer will be of interest. It will be observed that he points out the considerations which in his judgment show the advantage of consolidation when wisely effected:

My impression is that consolidation of manufacturers of a certain class of goods if properly managed cannot be otherwise than profitable, first, to the manufacturers; second, to the workmen, and, third, to the purchasers.

The increased profits to the manufacturers will come from the benefit of buying largely, paying promptly, reduced freight bills, decreased selling expenses by traveling salesmen and the elimination of competition. The workmen will benefit by the prosperity of the manufacturers in increased pay and steady work. The purchaser's benefit will come from being able to buy at a stable price and figuring his profits confidently on that price. Price cutting and irregular market make purchasers more conservative in buying, because if they buy at a certain price to-day and some one else comes along and offers the same goods at a lower figure the purchaser feels that he has made a loss on his first purchase, so he is more careful to buy only for his immediate wants. In fact, some large buyers say that they have no objection to the price of goods offered if they only know that they have them at the lowest price, and not have some other manufacturer offer them at a less price when next his salesman calls.

DRAWERS UNDER SHOW WINDOWS.

A RATHER unusual feature in store arrangement is seen in the store of Jordan Bros., Willimantic, Conn., in which the space under the show window platforms is utilized to good advantage. This is done by



Drawers Under Show Windows.

means of drawers about 5 feet long, which is the depth of the window, mounted on rollers, so that they can be easily pulled out and pushed back into place again. The arrangement is clearly shown in the accompanying illustration.

ATLAS TACK COMPANY.

ATLAS TACK COMPANY, George W. Weymouth, president and manager, announce, under date June 1, that they are now installed in their new mill at Fairhaven, Mass., and are fully equipped with the latest and most improved machinery in every department. It is further stated that as the Taunton office has been discontinued, all correspondence of whatever nature should be sent to the new address, Fairhaven, Mass.

TRADE ITEMS.

CLINTON WIRE CLOTH COMPANY, who recently abandoned their headquarters in Beekman street, where they have been for a long term of years, are now thoroughly settled in their new quarters, 33 Park place, New York. Their new premises have been thoroughly renovated, and they now occupy the street floor, basement and subbasement. They have commodious bins for storing stock and large drawers conveniently located to receive Brass, Bronze and Copper Wire Cloth, manufactured by them. They are also well equipped with power elevator, electric lights and other modern conveniences, with well appointed offices on the main floor.

DOWNES & Co., 68 Park place, New York, have recently been appointed New York agents of the Arcade Mfg. Company, Freeport, Ill., to succeed C. C. Naret, who is still in the employ of the company and continues to represent them. The lines of this branch of the business have been considerably extended and the present representatives are much better equipped to carry on the business. They carry a full line of fresh samples of the goods made by the Arcade Company. The samples of Toys are just arriving for the summer and fall trade. The Arcade Mfg. Company are manufacturers of large lines of House Furnishing Goods, Hardware Specialties, Cork Pullers and Toys.

THE NEW ENGLAND BOX COMPANY, manufacturers of Lock Cornered Wooden Boxes, Hard Wood Cases, Shooks, Egg Carriers, and Wooden Boxes of every description, have removed their general offices to Greenfield, Mass., on account of its proximity to their different factories. They expect that this concentration of their general facilities will result in greatly improved service. Their Boston office, long established at 221 Columbus avenue, and their New York office, at 90 West Broadway, will be continued as heretofore for the convenience of the trade in these localities.

THE INDIANAPOLIS WIRE & MFG. COMPANY, Indianapolis, Ind., who were incorporated on April 22, have begun the construction of two buildings at the corner of Beecher and Linden streets, on a lot purchased by them. One building is to be 24 x 70 feet and the other 24 x 60 feet. The company expect to commence operations by the middle of June. J. H. Witty is president of the company. The concern will manufacture Wire Window Guards, Tree Guards, Trellises, Settees, Chairs, Floral Designs, &c.

THE INDIANA STEEL & WIRE COMPANY, Muncie, Ind., have recently fitted up a special department in their Wire mill for the manufacture of high grade telephone and telegraph Wire, and are turning out a product which, it is said, is being well received by the users of this Wire. The other products of this mill are Plain and Coiled Galvanized Fence Wire, Wire Nails, Galvanized and Bright Fencing, Staples and Bale Ties. The mill is now running to its utmost capacity, and the company are turning out from 40 to 60 miles of their Diamond Mesh High Carbon Coiled Spring Fence Wire per day.

AMONG THE HARDWARE TRADE.

E. A. Buck & Co., Palmer, Mass., have bought C. W. Taylor's Hardware stock in Exeter, N. H., and have engaged C. W. Robinson to manage the business at that point. The stock comprises Shelf and Heavy Hardware, Stoves and Tinware, Agricultural Implements, Crockery, Sporting Goods, Woodenware, &c.

A. Ammundson has purchased the Hardware, Stove and Farm Implement business formerly conducted by Turek & Dvorak in Wagner, S. D.

G. R. Wylie has disposed of his interest in the Hardware firm of O. E. Carlton & Co., Leroy, Iowa, to N. B. Munch of Lacona. The business will be continued without change in style.

Frank Menefee has bought the Hardware store of Hawkins Bros., Oxford, Ind., and will continue at the old stand. The new proprietor will put in new fixtures and thoroughly renovate the establishment.

J. C. Petherman, formerly in the Hardware business at Lorchwood, has succeeded the Holmes Hardware Company in the retail business, at Kanawha, Iowa.

A. W. Eley has been succeeded in the Hardware, Farm Implement, Buggy and Harness business in Wetmore, Kan., by Eley & Henderson.

Ryan Implement & Hardware Company, Fort Dodge, Iowa, have increased their capital stock to $40,000. They have also added a Harness shop.

C. T. Fitts & Co., Hardware merchants, Sioux City, Iowa, have recently suffered a small fire loss, which was fully covered by insurance. This is the second loss of the same character within a year.

Steer & Thompson, Van Wert, Iowa, have disposed of their business to L. Buchanan, who has completely renovated the old store, erected an addition, 14 x 40 feet, and added $1000 worth of goods to the stock acquired.

C. Kimmell Company, El Reno, O. T., have been incorporated with a capital of $75,000, succeeding C. Kimmell.

Gidcumb & Scripture have succeeded B. Gidcumb & Co. in the Hardware business in Denton, Texas.

Wm. S. Long has recently engaged in business in Marquette, Neb., handling Hardware, Stoves, Tinware, Sporting Goods, Furniture, &c.

The Lee & Osgood Company, wholesale and retail Hardware merchants, Norwich, Conn., have completed plans for a new $25,000 store and business block.

Barnett & Lipe, dealers in Shelf Hardware, Stoves and Tinware, El Dorado, Texas, have been succeeded by Y. F. Barnett.

W. M. Black Mercantile Company have opened up in business in Garber, O. T., handling Shelf Hardware, Tinware, Stoves, Sporting Goods, Groceries, &c.

Hoge & Lewis have recently purchased the Hardware and general store business formerly conducted by Geo. N. Hutto in Glencoe, O. T.

D. B. Ashbrook of McFall, Mo., has opened a branch store at Carrollton, where he is carrying a stock embracing Hardware, Stoves, Sporting Goods, &c.

A. Deparade has sold his Hardware and Farm Implement business in Cordell, O. T., to J. K. Little, who has added a line of Farm Wagons and Vehicles.

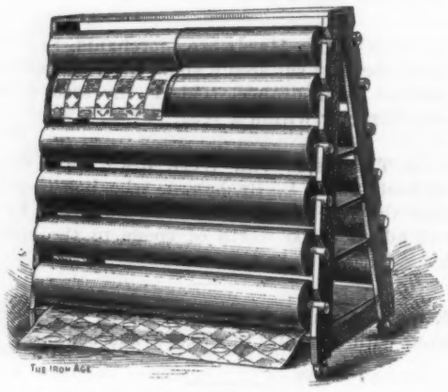
E. G. Sjovall has sold his Hardware, Stove and Tinware business in Stormsburg, Neb., to Carlson & Olson.

The New Mexico Hardware & Furniture Company, Tucumcari, N. M., have been succeeded by the New Mexico Mercantile Company, a stock company organized under the laws of New Mexico. The officers of the new concern are as follows: C. H. Rankin, president; J. I. Lamb, vice-president; I. C. Barnes, treasurer, and L. D. Allred, secretary. The company handle Hardware, Stoves, Tinware, Glassware, Lumber, Crockery, Furniture, &c.

Hendricks & Nehr have sold their wholesale and retail Shelf Hardware, Stove, Tinware, Buggy and Wagon business, at Guthrie, O. T., to the Stumpff Hardware Company.

OIL CLOTH AND LINOLEUM RACK.

THE accompanying cut represents a revolving rack for the display and retailing of Oil Cloth and Linoleum, in use in the Hardware establishment of A. W. Lieb & Co., Williamsport, Pa. It is remarked that the rack makes the show and sale of these goods a pleasure, instead of a dread. The rack is mounted on a pinion, which supports most of the weight, and has four roller bearing casters, one on each corner. It describes a circle 6 feet 6 inches in diameter when revolved. The rack will hold 12 pieces of eight-quarter cloth, or each roller will hold two four-quarter pieces. The rack at the bottom is 3 feet 6 inches wide and 6



Oil Cloth and Linoleum Rack.

feet 2½ inches long. In hight it is 6 feet 10 inches, including the casters. The uprights are made of oak 1½ x 6 inches, the top plank is of 1½-inch stuff, while the bottom frame is made of 2 x 6 inch pieces, reinforced lengthwise by yellow pine 2 x 4 and 4 x 5 inches. Under the center of the rack is a cross piece which holds the pinion and carries most of the weight. The rollers holding the Cloth are of white pine 2½ and 2¾ inches in diameter, as some Cloth rolls closer than others. The rack can be turned around easily, so as to show customers the goods on either side. Before having the rack made the firm experienced much difficulty in handling this line, as in upending the rolls the edges of the Cloth were more or less damaged, and the rolls frequently fell over. The firm have now made arrangements to have racks of this kind made to sell, knock down, except the platform, which will be mortised and framed together.

THE OLDEST SHOVEL IN THE UNITED STATES.

SIMMONS HARDWARE COMPANY, St. Louis, Mo., some time since issued a circular with an illustration and description of the oldest Shovel in the United States. It was made for the State of Massachusetts in the early part of the nineteenth century by Oliver Ames. It was recovered from the State Arsenal at Watertown, Mass., over 50 years ago, since which time it has been in the possession of the Ames family. The Shovel was loaned to the Simmons Hardware Company to be used in breaking ground for the Louisiana Purchase Exposition, and was used for this purpose at the ground breaking ceremonies, held on December 20, 1901.

P. A. MYERS, junior member of the firm of F. E. Myers & Bro., Ashland, Ohio, will take a well earned vacation this summer and will devote it to making an extended tour of Europe. In his travels he will visit the agencies which have built up the company's extensive business abroad and will study trade conditions with a view to further extensions. He sails June 14 on the "Etruria," arriving in London in time to witness the coronation of Edward VII. The trip will include England, Holland, Belgium, Germany, Switzerland and France. Mr. Myers expects to return on the "Umbria" August 16.

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THE USES OF COAL TAR PRODUCTS.

THE best known and most largely used Felts and Paper for roofing and sheathing purposes are to-day manufactured from coal tar, or materials resulting from its distillation. It is a matter of common knowledge that coal tar is produced at gas works in the operation of manufacturing illuminating gas from coal. The direct distillation of coal tar produces first, light oils, or oils heavier than water; and finally, a residuum commonly sold in the market as coal tar pitch.

The latter material is now used for a large variety of purposes, owing to its high water proof and nonconducting properties. Roofing and Building Papers are saturated and lined with it. A perfectly water proof Building Paper is produced by cementing together two sheets of ordinary dry paper with a layer of coal tar pitch, not exceeding 1-100 inch in thickness, a better quality having three layers of paper and two fillings of pitch. The same dry paper cemented to a wool felt with pitch produces a water proof deadening felt, which is the best nonconductor of sound of any felt that so far has been produced.

That materials so produced have proven satisfactory is attested by the largely increased rate of consumption in the past ten years. Their manufacture was formerly confined to two or three of the Eastern cities, whereas to-day large factories are located in almost all of the large cities East, West and South, many of which, however, following the example in other trades, have been consolidated into fewer and more compact concerns, although new competition is continually entering the field.

All the advantages to be derived from the use of these materials are known to comparatively few people, while some of the advantages are known to many. Gravel, slag and ready roofings, water tight floors and cellars, street pavements and sidewalks, are constructed from them in their various combinations. Dead oil produces lampblack and is used under the name of creosote oil for the saturation of timber, to prevent decay.

METAL BANK WORK FOR JAPAN.

HOWARD & MORSE, 45 Fulton street, New York, have just executed an order in handsome brass scroll work for office protection in a large Japanese banking house in Yokohama. The designs, which were unique, were the creation of Japanese artists, and were embodied in carefully written specifications in English, comprehensive in all details. In order to follow the designs, which had been prepared without knowledge of or concern as to the peculiar facilities necessary to develop them, the company had to construct special devices for crimping, forming and riveting the meshes, as well as dies for the somewhat heavy and elaborate cornice, the object sought being a rigid and uniform web, which equals in beauty some and is superior to much such work erected in banking houses in New York. The order extended over several months in manufacture, cost about $6000 and weighed over 2 tons, from which may be inferred the quantity required and the elaborateness of the office in which it is to be used.

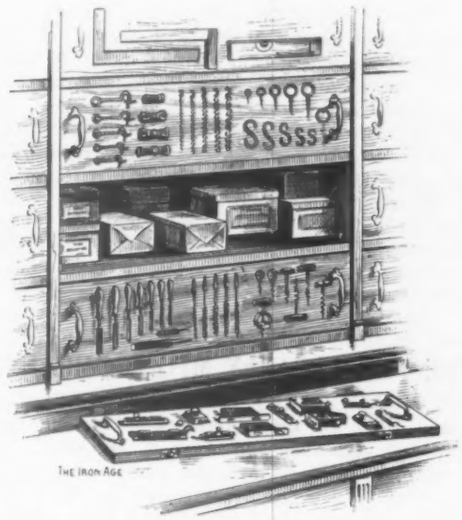
In this connection it is interesting to recall the fact that it was only in 1852-54 that Commodore Matthew G. Perry, an American Naval officer, commanded an expedition to Japan which summarily destroyed several Japanese forts for some barbaric hostile acts, and without a formal declaration of war. The resulting negotiations opened trading ports in 1865 to foreign commerce.

The use of such costly and beautiful work in a mercantile palace (for the house does both a commercial and banking business) is suggestive of long and speedy strides in civilization and important commercial influence.

S. R. CHURCH, 307 Sansome street, San Francisco, Cal., is the publisher of the Baseball Schedule and Memorandum Book, which is issued in three volumes at 10 cents each. The volumes also call unobtrusive attention to Mr. Church's business as agent for the sale of Pig Iron, Coke, Fire Brick, Cement, Fire Clay, &c.

SAMPLING STOCK.

THE question as to the best method of sampling goods and of keeping stock on shelves is an unsettled one in the minds of most Hardware merchants. The system employed by Stephen W. Woodbury, Northampton, Mass., which is satisfactory to him, is illustrated herewith. It will be noticed that the shelf goods are kept in their original packages on the shelves instead of being put in shelf boxes, as is the more usual custom. The front of each shelf space is then closed by a board cut 8 x 33 inches. To the front of this are attached two brass handles, one on each end, as illustrated, and in the top are



Sampling Stock.

countersunk two of Frog's Patent Self Acting Door Catches, which may be seen in the board resting on the counter. When the front is put in place these are first pressed against the upper shelf and the strength of their springs holds the board in position. The front of this board is sampled with the line kept in its shelf space. When a customer asks for a certain line, instead of taking the goods from stock, this board is removed and placed on the counter, so that the customer can choose the variety wanted from the samples. The prices and numbers of the articles are generally marked on the sample boards under each sample.

MERCHANTS' CATALOGUES.

Evenson Bros., St. Peter, Minn., have recently issued a catalogue in the interest of their Buggy and Stove department. On the front cover of the catalogue it is stated that "the contents of this book will interest any man or woman who has the interest of his or her pocket book at heart." This is their fifth year in the Buggy business, and during that time they have had a standing offer of $5 for every spoke found in their Buggies that was not of hickory. During this period they have disposed of nearly 300 Buggies, a fact which they make good use of in supporting the claims made for the quality and durability of their line.

Wilmington Farm Supply Company, Wilmington, Del., have lately distributed their annual illustrated catalogue for 1902 of Farm and Garden Supplies. It is a book of more than 100 pages and illustrates a large variety of Agricultural Implements and Machinery, Wagons, Pumps, Hay Knives, Scythes, Belting, Wrenches, Pruning Shears, Hog Rings and Ringers, &c. They state that their efforts during the past season along the line of jobbing implements throughout Delaware, Eastern part of Maryland, Pennsylvania, New Jersey and New York have met with good success, and that they are now better prepared than ever before to meet the wants of dealers. They remark that the smaller Hardware houses in rural districts are handling Agricultural Implements to a greater extent than formerly.

REBATES TO THE RETAIL MERCHANTS.

AN illustration of the manner in which a prominent manufacturing company are endeavoring to establish relations with the retail trade is given in a form of contract prepared by them and circulated by their travelers among the merchants. This contract, which is reproduced below, is, it will be observed, an agreement on the part of the merchant to purchase from the manufacturers direct all of the goods of their manufacture which he sells. As a reward for this, he is to receive a rebate of 5 per cent. at the end of the year. The form of agreement is as follows:

To the ——— Manufacturing Company:

In consideration of the sum of One Dollar ($1.00) to me in hand paid, receipt of which I hereby acknowledge and other considerations, I hereby agree to order all ——— ware which you sell exclusively from you from this date until December 31, 1902, at fair and reasonable prices, with the understanding that if I do purchase exclusively all such ——— ware from you during the said time, that on receipt of satisfactory proof to you by me of same, that on December 31. 1902, you will pay me an extra cash bonus or rebate (to be considered strictly confidential) of five per cent. (5%).

Yours very truly,

THE PHILIP CAREY MFG. COMPANY.

THE PHILIP CAREY MFG. COMPANY of Lockland, Ohio, are manufacturers of Flexible Cement Roofing and Asbestos and Asphalt Materials. Their Lockland plant produces Asbestos and Woolen Felt Coverings. About 12 acres are covered by their factory buildings. They have recently built a large three-story brick building to supply the demand for their Roofing, Roofing Paint and similar materials. The company also manufacture Asbestos Sectional Steam Pipe and Boiler Coverings, and 85 per cent. Magnesia Steam Pipe and Boiler Coverings, their factory at Corsons, Pa., being devoted exclusively to the production of the latter. This plant commenced operations during the early part of last year, but was destroyed by fire on June 9, 1901. Rebuilding was immediately commenced, but the new plant was only placed in operation about three months since. They have, however, shipped about 50 carloads of these goods since the resumption of business.

THE AURORA ACETYLENE COMPANY.

HARRIS & PARTRIDGE, formerly of Jacksonville, Fla., on account of the growing demand for their Aurora Carbide Feed Acetylene Generators, have reorganized their business into the Aurora Acetylene Company, and changed their place of manufacture to Chattanooga, Tenn. The generators are designed for lighting plants for cities, factories, churches, hotels, residences, stores, schools, mills, &c. A feature of the company's generator is that it feeds small quantities of carbide into a large body of water. It is pointed out that gas is only made as it is used, that there is no waste, and no after generation. The company guarantee the material and workmanship in the machine, the amount and quality of gas, and the cleanliness of pipes and burners. They were given the highest award and gold medal at the Charleston Exposition.

AMERICAN CUTLERY COMPANY.

THE AMERICAN CUTLERY COMPANY, Chicago, have determined to build an addition to their factory, the present one being too small for their requirements. The new building will be of mill construction, with pressed brick front, covering the property at 171 to 175 Mather street, and connecting with the present building, and will be six stories high. It will be equipped with Corliss engine of about 800 horse-power. A new electric plant will also be installed, together with a number of improved machines of special design for the manufacture of Cutlery and Hardware Specialties. From $75,000 to $100,000 will be expended in these improvements.

PRICE-LISTS, CIRCULARS, &c.

THE M. SEWARD & SON COMPANY, New Haven, Conn.: Carriage Hardware. An illustrated catalogue and price-list includes Clips, King Bolts, Canopy Top Standards, Dash Feet, Brace Ends, Foot Rails, Body Hangers, Block Plates, Fifth Wheels, &c.

THE WM. SCHOLLHORN COMPANY, New Haven, Conn.: Pliers, Nippers, Punches &c. An illustrated catalogue and price-list shows lines of Bernard Paragon, Elm City and Lodi Pliers, Nippers, Punches, &c., also Spring Dividers and Pencil Holders.

LYON, CONKLIN & Co., Baltimore, Md.: Roofing Materials. An illustrated catalogue calls attention to the fact that the firm have added to their business the manufacture of Galvanized Iron Eave Trough and Conductor Pipe, plain, round and corrugated. They also manufacture Stove and Heater Pipe, both black and galvanized.

SOUTH BEND TOY MFG. COMPANY, South Bend, Ind.: Wooden Toys. An illustrated catalogue is devoted to Croquet Sets, Ball Bats, Children's Wagons, Carts, Wheelbarrows, Rocking Horses, Tables, Chairs, Swings, Doll Carriages and Go Carts, &c.

THE BARNES TOOL COMPANY, New Haven, Conn.: Tools and Machines. An illustrated catalogue and price-list is devoted to Pipe Cutters, Pipe Tongs, Pipe and Bicycle Wrenches, Hand and Foot Power Sawing Machines, Miter Cutters, Nautical Steering Wheels, &c. The company have lately begun handling the Johnston Automatic Pipe Wrench.

COLUMBIAN HARDWARE COMPANY, Cleveland, Ohio: Vises and Anvils. The company are distributing a handsomely printed catalogue and price-list devoted to this branch of their business. A view of the company's large works covers two pages of the catalogue.

SIMMONS HARDWARE COMPANY, St. Louis, Mo.: Catalogue No. 421. This contains over 300 pages and is devoted to Builders' Hardware, Art Goods, &c.

THE NORWICH NICKEL & BRASS COMPANY, Norwich, Conn.: Display Frames, Stands and Specialties for show windows and store interiors. Their 1902 catalogue and supplement No. 1 relate to these goods.

THE PHILIP CAREY MFG. COMPANY, Lockland, Ohio: Magnesia Flexible Cement Roofing and Steam Pipe and Boiler Coverings, Asbestos Sectional Steam Pipe and Boiler Coverings, and Asbestos and Asphalt Materials. Catalogues are issued relating to these goods.

THE AMERICAN UTENSIL COMPANY, Baltimore, Md.: The Beveridge Sanitary Cooker. A circular illustrates these goods, which are made in different sizes in tin, polished copper and steel enamel.

DECATUR CORNICE & ROOFING COMPANY, New Decatur, Ala.: Illustrated catalogue of Cornices, Skylights, Tin Roofing, Eave Troughs, Gutters, &c.

C. COWLES & Co., New Haven, Conn.: Catalogue No. 13. This is devoted to Carriage Lamp designs, of which descriptions and prices are given.

THE SNELL CYCLE MFG. COMPANY, Toledo, Ohio: Catalogue No. 10, showing their line of Snell Bicycles for 1902. It also illustrates their Hussey Forward Extension, Adjustable and Reversible Handle Bar, which was put on the market last season for the first.

THE HOLLEY MFG. COMPANY, Lakeville, Conn.: Hand Forged Pocket Cutlery. The company issue a supplementary catalogue, accompanying which is a price-list. The paging of the catalogue is continued from the company's regular catalogue. The business was established in 1844, and is claimed to be the oldest Cutlery manufactory in America. The catalogue illustrates a variety of Pocket Knives with sterling silver, pearl, buffalo, ivory, stag, German silver and cocoa handles, the blades of which are hand forged.

F. MEYROSE LAMP & MFG. COMPANY, St. Louis, Mo.: Lamps and Lanterns. An illustrated catalogue shows Tubular, Cold Blast, Search Light, Railway, Lake and

River, Conductors' and Boys' Lanterns; Driving, Station, Street, Bicycle, Hand and Side Lamps; Mammoth, Student and Library Lamps, Lamp Burners, &c.

WIEBUSCH & HILGER, 9-15 Murray street, New York: American and foreign Hardware, Cutlery, &c. An illustrated supplement to their catalogue and price-list, 1900 edition, is devoted to Grass Hooks, Bread Knives, Pruning Shears and Tree Pruners, Pliers and Hand Power Sheep Shearing Machines.

J. F. SCHMELZER & SONS ARMS COMPANY, Kansas City, Mo.: Catalogues Nos. 175, 914 and 915. These are illustrated and relate to Bicycles and Sundries, Sporting Goods and Fishing Tackle, Kodaks, Bathing Suits, Cutlery, Hammocks, &c.

BARLOW MFG. COMPANY, Holyoke, Mass.: Display Fixtures. An illustrated catalogue, supplement B, is devoted to Display Fixtures for store interiors and show windows. The company are also sales agents for New England and the East of combination Show Cases manufactured by the Grand Rapids Fixtures Company, Grand Rapids, Mich.

THE UNITED ELECTRIC HEATING COMPANY, Detroit, Mich.: Electrically heated Sad Irons. A folder issued by the company shows the Irons in all styles, shapes and weights. It is explained that they will operate on any electric light or power circuit, direct or alternating.

THE TROY WAGON WORKS COMPANY, Troy, Ohio: Troy Wagons. Skein and Tubular Axle Wagons of various styles are shown in the company's catalogue; also Pivot Axle Wagons.

MILBURN WAGON COMPANY, Toledo, Ohio: Buggy and Spring Wagons. An illustrated catalogue of Milburn vehicles, relating to the Buggy and Spring Wagon department, which is entirely separate from the Farm Wagon and Business Wagon departments, shows a varied line of these vehicles.

REICH GRANITE WARE COMPANY, Cleveland, Ohio: Enameled Steel Ware. The company's catalogue illustrates first quality Enameled Ware in all colors, white lined; also blue recoated seconds and gray seconds.

THE INITIAL TOE PAD COMPANY, Three Rivers, Mich.: Carriage Trimmings. Among other goods in this line illustrated in a catalogue and price-list are Seats, Tops, Cushions and Backs complete as sets. This plan is followed to enable the small builder to know exactly what the complete set of Trimmings with seat will cost; also that he may be in a position to order Trimmings with the assurance of their fitting the seats.

P. LOWENTRAUT MFG. COMPANY, Newark, N. J., for whom John H. Graham & Co., 113 Chambers street, New York, are sales agents: A 21-page illustrated booklet of Ticket Punches, a leading feature of which is the great number of cutting designs shown for which they have dies, in connection with various punches, two of the latter being new punches, while the designs number almost 1200 in all.

WHITMAN AGRICULTURAL COMPANY, St. Louis, Mo.: Agricultural Machinery, &c. The company issue three illustrated catalogues, one each relating to Agricultural Machinery, Cattle Feeding Machinery and Bailing Presses.

O. B. NORTH & Co., New Haven, Conn.: Saddlery Hardware. Illustrated price-list No. 5 shows this line of goods finished in nickel, imitation rubber, solid brass, and electro brass.

UP-TO-DATE MFG. COMPANY, Terre Haute, Ind.: Fencing, Gates, &c. The company manufacture over 50 designs of Lawn Fencing, several of which are shown in their catalogue. They also show Tree and Shrubbery Guards, Wire and Iron Signs, Bicycle Racks, Window Guards, Office Railing, Steel Ranges, &c.

W. L. BARRETT, Bristol, Conn.: Barrett's Standard Glass Cutters. These goods are shown in a price-list in a large variety of styles, including Glass Cutters in combination with other tools. Illustrations are also given of Circle Sweeps for cutting circles and of Glass Tube Cutters.

A. L. SILBERSTEIN, 459-461 Broadway, New York: A 20-page illustrated catalogue of Carbo-Magnetic Razors, Griffon brand, in a great variety of styles and patterns, both as to blades and handles. They have also just issued another similar catalogue of their Griffon brand Scissors in patented sheaths, on which dealers' imprints are placed. This line includes a large assortment of Shears, Trimmers' Scissors and Manicure and Pedicure Implements, including Nail Nippers, &c.

THE ANDREWS WIRE & IRON WORKS, Rockford, Ill.: Catalogue No. 24. Illustrations with prices are given of Architectural Iron Work, Wire Kitchen Articles, Wire Cloth, Dolls' Beds, Calf Weaners, Cork Pullers, Stands, Crockery Hangers, Easels, Display Racks, Elevator Inclosures, Wire Fencing, Flower Pot Stands, Garment Hangers, Electric Light Guards, Stable Fixtures, Hanging Baskets, Letter Baskets and Trays, Music Racks, Office Railings, Wrought Iron Work, &c. The catalogue is well printed, provides a large number of pages for memoranda and contains a large variety of goods of interest to the Hardware Trade.

THE NATIONAL CUTLERY COMPANY, Philadelphia, Pa.: Scissors, Shears, Snips, &c. An illustrated catalogue and price-list illustrates these goods in a variety of sizes and styles, including Dental Shears, Orange Clippers and Letter Openers. The company state that they make goods of first quality only.

PROGRESSIVE MFG. COMPANY, Torrington, Ky.: Pamphlet showing some of the metal specialties which they are prepared to make for others, their business being confined entirely to making goods to order. The company state that by their new processes they are able to make at less cost many articles which have heretofore been made only on screw machines.

ROCKFORD TACK & NAIL COMPANY, formerly Joslyn & Church, Rockford, Ill.: Illustrated catalogue of Tacks and Nails. The catalogue will be sent on application.

SIDNEY STEEL SCRAPER COMPANY, Sidney, Ohio: Besides their English catalogue the company issue Russian and Spanish editions for foreign circulation, calling attention to their line of Haslup's patent all steel Drag and Wheeled Scrapers, wood and steel framed Wheelbarrows and Trucks.

BUTLER BROS., 495 and 497 Broadway, New York: This concern, who sell to merchants only, issue a circular entitled "Mid-May Specials," in which net prices are given on a number of lines, including many of interest to Hardware dealers. They also issue a circular giving prices on a large assortment of Fourth of July goods, the prices quoted holding good until the end of June unless changed by special announcement.

THE I-XL & GOSHEN PUMP COMPANY, Goshen, Ind.: A series of catalogues, catalogue I relating to Wood and Chain Pumps and the Oval Churn; catalogue K to Screen Doors and Windows, and catalogue L to Kitchen Furniture. The company also manufacture Ladders, Lawn Swings and Steel Tanks.

MISCELLANEOUS NOTES.

The Magic Fly Chaser.

The Shuee-Bahls Hardware Company, La Fayette, Ind., are offering what they term the Magic fly chaser, a fluid which is used in connection with a sprayer as a specific against horse flies, fleas, mosquitoes, gnats and all insects affecting animals. It may also be used to keep flies off of cattle and to kill chicken lice.

Glasbrite.

Clark & James, 122 Water street, Cleveland, Ohio, are manufacturing Glasbrite, a chemical composition for cleaning windows, arc and incandescent lamps, mirrors, cutlery, silver, brass, &c. The composition is put up in cakes, and is applied with a damp sponge or cloth and polished with a dry cloth. It so thoroughly polishes glass, it is explained, that dirt and dust do not adhere readily, and that when they do they can be wiped from the glass with a dry cloth. It is remarked that the composition contains no grit or acid, that it simply cuts the dirt and that being a chemical it will not scratch the finest glass.

Jerome Design.

Russell & Erwin Mfg. Company, New Britain, Conn., and 43-47 Chambers street, New York, have recently added a new design to their already large number of such sets in fine bronze hardware for the trim of front, vestibule, sliding and inside doors, &c., as here illustrated. It is known as the Jerome, and is of the style of the Empire, the material being real cast bronze in

Jerome Design.

various finishes, among which are old copper mottled, antique brass and polished bronze natural color. This design is obtainable in the smaller articles also, such as push buttons, flush and bar sash lifts, as well as store door handles for large doors. Following their established custom the company have issued an 18-page booklet giving the details of the various combinations of locks and the arrangement of the various sets of this design for the convenience of the buyer, for gratuitious distribution.

The Ideal Roller Bearing Tire Bender.

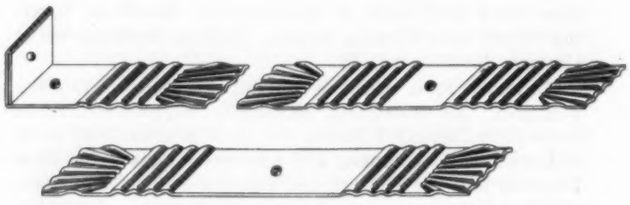
The Weyburn Company, Rockford, Ill., have added to their line of hardware and blacksmith's supplies the tire bender shown herewith. It will bend tire up to

The Ideal Roller Bearing Tire Bender.

6 inches wide to a circle of 30 inches or larger, it is remarked. As a result of the roller bearings, it is claimed that over 50 per cent. of power is saved.

Taft's Improved Metal Wall Ties.

The accompanying illustrations relate to metal wall ties placed on the market by R. C. Taft, Columbian Building, Topeka, Kan. The ties are made of galvanized iron of a gauge suitable for the purpose, and are corrugated in the manner shown in the illustrations. The construction is such as to render them especially adapted for hollow or double walls, as well as for brick veneer construction. The tie in the upper left hand por-



Taft's Improved Metal Wall Tie.

tion of the cut shows how the end is bent at a right angle and perforated for fastening to the frame or wooden support.

Mann's Green Bone Cutters, 1902 Model.

The accompanying cuts show two styles of the improved green bone cutters offered by F. W. Mann Company, Milford, Mass. The cutters are designed to cut raw bone, meat and gristle, to increase the laying capacity of fowls. One of the new features is the open split cylinder, which gives easy access to the knives and permits the machine to be kept clean more easily. An automatic governing feed is referred to as the greatest improvement in this year's machine, which is arranged to give the operator complete control over the power required. It is explained that it can be set to suit the strength of a child or a youth or a strong man, and that each person will get a result in proportion to the amount of strength used. The cutter shown in Fig.

Fig. 1.—Mann's Bone Cutter No. 5 B. M.

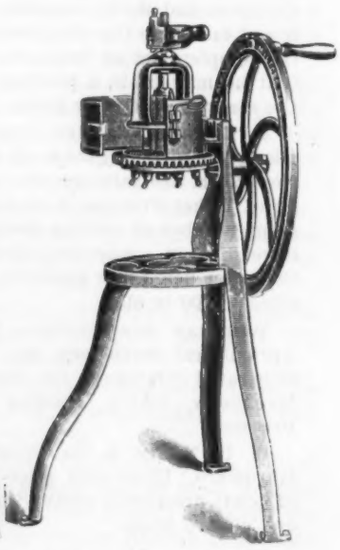


Fig. 2.—Mann's Bone Cutter No. 7.

1 is intended for flocks of 15 to 25 hens. It is mounted on an iron stand with a table to place a pan to catch the bone, and has a capacity of 15 to 20 pounds per hour. The machine illustrated in Fig. 2 is intended for flocks of 40 to 100 hens. It is provided with a large open cylinder, heavy balance wheel, with an adjustable handle, and has a capacity of ½ to 1 pound per minute. Cutters are made in a number of other sizes, including power machines, with a capacity from 250 to 500 pounds per hour. The larger machines are designed for persons carrying on an extensive business in either green cut bone or fertilizer.

Extension Clothes Line Prop.

The extension clothes line prop shown herewith is put on the market by the Chicago Wooden Ware Company, Chicago, Ill. The prop can be folded to a 5-foot length, and is adjustable to any length from 5 to 9½ feet. It has galvanized iron mountings, and, it is stated, is strongly made, with nothing about it to break or to get out of order.

Extension Clothes Line Prop.

The Eagle Mechanically Jointed Frame Bicycle

The accompanying cuts show parts of the mechanically jointed frame bicycle manufactured by the Eagle Bicycle Mfg. Company, Torrington, Conn. In this construction the front and rear parts of the frame are made separate, and are fastened together mechanically at the crank bracket and seat post cluster. The frame

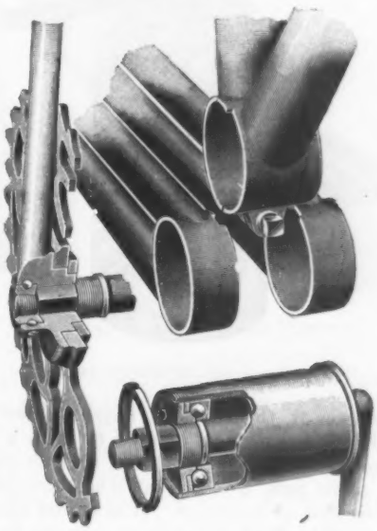


Fig. 1.—The Eagle Crank Hanger Bracket.

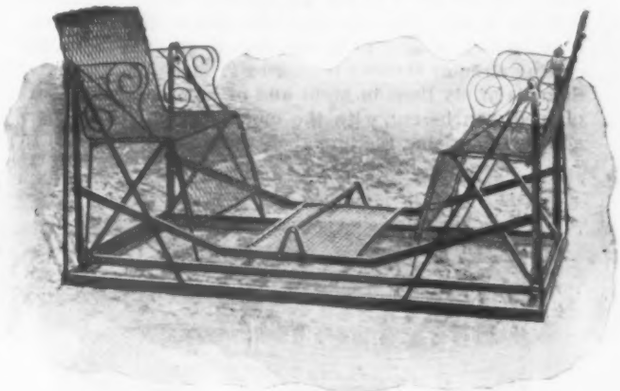
is locked together at the crank hanger by means of an internal sleeve and lock nut. The turned steel bearings are fitted into the sleeve, and by removing the left crank and sprocket the sleeve and crank shaft may be withdrawn without disturbing the adjustments of the bearings. The upper rear frame is joined to the main

Fig. 2.—The Eagle Seat Post Cluster.

frame by a lock nut, having both right and left hand threads. This device, it is explained, also securely fastens the seat post by forcing against it an internal binding plug, while it simultaneously draws together and rigidly secures the rear frame to the front frame. This is referred to as a simple, effective and mechanically perfect manner of accomplishing two results by one operation. It is stated that the removable sleeve permits the bearing cups to be fitted absolutely parallel to one another, permitting a much nicer adjustment, making the machine run much easier; also that a perfect alignment of the chain is always certain, owing to the exactness maintained in locking together the mechanical joints at the crank shaft. The company refer to the jointed frame as strong, rigid and immovable, yet simple and easy of repair.

Up-to-date All Steel Lawn or Porch Swing.

The accompanying cut represents a swing put on the market by the Up-to-date Mfg. Company, Terre Haute, Ind. The frame is made of angle steel and the seats of woven wire. The frame is black enameled and the seats green enameled. Scrolls and points are painted with aluminum. The swing is furnished with an awning if desired. A feature of the swing is that it is operated entirely by the pressure of the foot on a small bar in the bottom of the swing, a two-pound pressure with the foot being sufficient, it is explained, to swing four persons. The manufacturers state that the swing

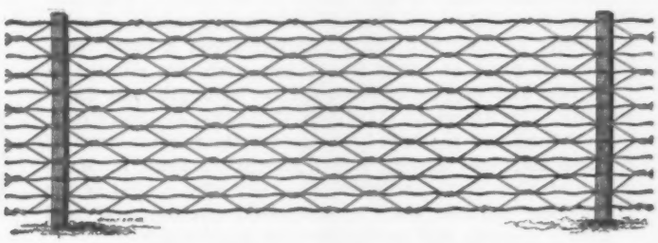


Up-to-date All Steel Lawn or Porch Swing.

will last a life time, that it is perfectly safe for children, that the seats are comfortable, that the swing will not rot or warp if left out of doors in the rain or sunshine, and that it is noiseless and light running.

The Diamond Mesh Coiled Spring Fence.

The Indiana Steel & Wire Company, Muncie, Ind., are offering the fencing shown in the accompanying illustration. The line wires are of high carbon coiled spring wire, which allows for expansion and contraction,

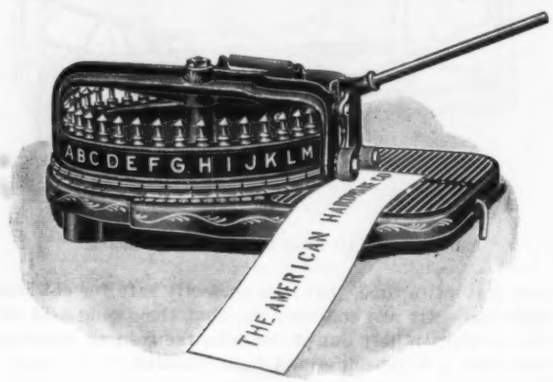


The Diamond Mesh Coiled Spring Fence.

keeping the fence, it is remarked, always straight, tight and sightly under all conditions of weather, besides allowing the fabric to be easily and perfectly stretched by an inexperienced person over any kind of ground, rough or even, rolling or hilly. The coiled spring in the line wires also obviates the use of ratchets. It is explained that the mesh wires are so wrapped about the line wires that all wires become a brace to the others, giving great strength as well as closeness of mesh, making a fence which the manufacturers refer to as "horse high, bull strong, pig tight and chicken proof."

The National Stencil Machine.

The stencil machine shown herewith consists of a cast iron bed plate which forms a platform on which the stencil paper is laid. A series of guide lines ¼ inch apart are to enable the operator to align the sheet exactly. Space marks on the edge of the machine show the hight of line to be cut from top of stencil paper. The paper is fed on a straight line by two knurled wheels operated by a ratchet connected with the operating lever, so that every time the lever is depressed the wheels feed the proper distance. The punches and dies are arranged on a circular platen to turn freely either to the right or left. In making a stencil the proper letter is brought to a central position in front, the operating lever is depressed and the letter is cut. The letters are ⅝ inch high and of the style known as "block letter," which is referred to as generally recognized as being the clearest and best suited for the purpose. The punches and dies, it is remarked, are made of an extra grade of tool steel and are fully warranted. Each punch is held rigidly in proper alignment by a special patented guide, and the top of each punch is conical in shape, so that if the letter is not brought to an exact position in the center the cone centers itself. The under part of the cone is cut away to receive a lifting finger, so that if the punch should catch in the die for any reason the finger will lift it out. The machine also has a special attachment, which is said to be peculiar to this machine, for cutting circular stencils from 7 to 17 inches in diameter. Stencils of six lines in hight and of any length, it is explained, can be cut with the machine. It has 40 characters, comprising the alphabet, the numerals from 0 to



The National Stencil Machine.

9, and punctuation marks. It is pointed out that an expert marker is not required when the machine is used, as a boy can operate it, and that stencils may be cut at an expense of one cent each, this being much more economical than having them cut to order. The machine is portable and can be used on any ordinary table, counter or desk and can be moved about a room from place to place at will. Its various parts are alluded to as few and especially designed for strength and durability. The American Hardware Company, 42 John street, New York, are the sole licensees for the manufacture of these machines under patents granted to John W. Munson of New York, and state that they offer a trial of the machine without cost to interested parties, and will gladly furnish full particulars on application.

The T. & B. Fruit Jar Holder.

The Tarbox & Bogart Mfg. Company, Cleveland, Ohio, are putting on the market the fruit jar holder shown herewith. The band which encircles the jar is a ¾-inch crucible steel ribbon, specially rolled to exactness in gauge, and its flexibility allows it to conform to the jar. To this band is riveted a symmetrically formed forked handle, the attachments being made at points opposite the diameter of the quart, or medium sized, jar, so that, when the wrenching movement occurs, instead of an impact, it is explained, there is a tangent action, not a crushing action. The locking device is comprised in a draw bar which intersects with a series of perforations in the loose end of the encircling band, and is operated by acting in an eccentric latch, pivoted to the handle, sufficiently back of the point of contact with the jar to apply no direct pressure upon the jar. It is pointed out that the cam of the latch can be so timed in relation to the center of action as to give a dead center,

Fig. 1.—The T. & B. Fruit Jar Holder.

making it self locking. To add elasticity to the flexibility of the band, and to increase the friction, a rubber cushion is inserted in an offset of the band between the forks of the handle. It is remarked that the compression upon the jar being evenly distributed, and so gently

Fig. 2.—Fruit Jar Holder in Use.

applied, makes it, theoretically, impossible to crush the shell. The holder may be applied to form a handle to circular receptacles of various sizes, such as glass bowls, tin cans, paint pots, &c., so that when the jar is hot it may be handled as a pitcher. It is stated that in opening jars there is no disturbance to mix the musty scum with the fruit, as the jar need not be tilted nor shaken. The holder is designed to retail at 15 cents.

The Ottumwa Ball Bearing Sash Pulley.

The accompanying cuts illustrate a sash pulley offered by the Johnston & Sharp Mfg. Company, Ottumwa, Iowa. The pulleys are pressed from smooth sheet steel,

Fig. 1.—The Ottumwa Ball Bearing Sash Pulley.

Fig. 2.—Side View of Wheel of Ottumwa Pulley.

and are swaged together without pins, rivets, shafts or bushings. The two sides of the case are in duplicate and are stamped centrally and inwardly, forming, when joined, a circular stepped bearing, the two contacts interlocking and when swaged, joining the two sides solidly through an eyelet with 7-16-inch bearing. The face plate is secured with two projecting lugs on each

side stamped rigidly. Within this case and on the central stepped bearing revolve eight 5-16-inch polished balls, conveying a 2⅛-inch pressed wheel, the two sides of which are swaged together with six interlocking lugs. The manufacturers state that the pulleys are noiseless and frictionless, that no special machine is necessary to set them and that they cannot cut, bind, squeal or stick. The weight of a 50-dozen case is 100 pounds.

The Tannewitz Toilet Fastener.

The cuts shown herewith relate to a device for fastening looking glass frames to bureaus, dressing tables, sideboards, chiffoniers, &c., which is put on the market by the Hardware Supply Company, Grand Rapids,

Fig. 1.—The Tannewitz Toilet Fastener.

Mich. The two parts of the fastener are illustrated in Fig. 1, the plates being shown open as when the toilet frame is to be set in place on the case or article of furniture. The screw is headless, ⅜ x 2½ inches, or longer if desired, and is made with a groove cut around it about ¼ inch from the end. The screw is turned into

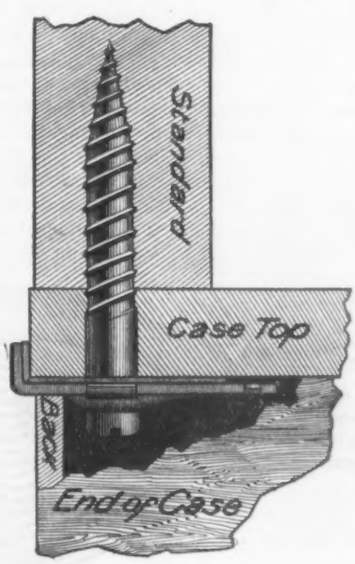


Fig. 2.—Fastener in Place.

the ends of the frame uprights, and extends downward through a hole bored in the case top, and also through the hole in the fastener. The sliding plate of the fastener is then driven into place, the sloping edges of the slot running into the groove of the screw and thus drawing the toilet frame down tight to the bed of the case, as shown in Fig. 2. It is remarked that the downward pull on the screw is so great when the sliding plate is driven in, that if there has been any warping of the frame, it will be readily pulled down into place and securely held. When it is desired to remove the toilet frame a screw driver is inserted, as shown in Fig. 3, and turned to one side, so as to draw out the sliding plate, when the frame can be lifted from the case. It

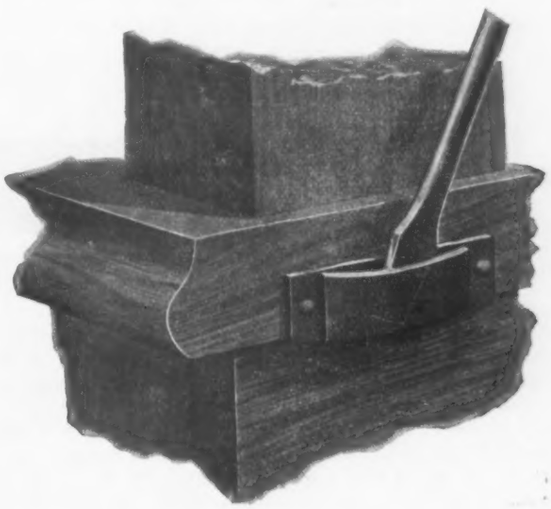


Fig. 3.—Opening the Fastener.

is pointed out that when moving furniture about, through doorways, &c., there is nothing projecting from the fastener to mar casings or to catch and throw the fastener open. The two brads shown in Fig. 3 are simply to hold the fastener in place until the toilet frame is put on. It is explained that there is no strain on the brads, no possibility of the frame moving when once adjusted, and that the fastener cannot work loose.

The Universal Vegetable and Fruit Masher.

L. D. Parkhurst, Danielson, Conn., is placing on the market the masher herewith shown. The base is made of malleable iron, heavily tinned to prevent rusting. The wooden handle is provided with a heavy coat of

The Universal Vegetable and Fruit Masher.

black enamel, so that it will not be affected by hot water or steam when in use. The mashers are well and substantially made, and are packed half dozen in a box, one gross in a case.

Mercury Plumb Bobs.

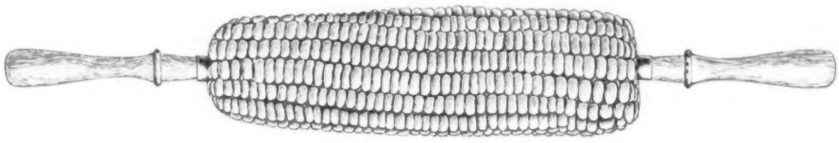
L. S. Starett Company, Athol, Mass., and 123 Liberty street, New York, have recently begun the manufacture of an improved form of mercury plumb bobs, as here illustrated. The marked characteristics of this tool are great weight in proportion to size, low center of gravity, small diameter, thus offering slight resistance to wind, hardened and ground point, reel at top to hold line when not in use, and a device at the extreme upper part for securing the end of cord. Parts of the body

Mercury Plumb Bob No. 87.

are knurled, and the remainder polished, the entire surface being nickel plated. The mercury contained in the barrel or cylinder body is held in place by an inside slotted cap, which works in a thread on the inner side of the cylinder. The bob is made in 4, 5, 5½ and 6 inch lengths, the diameters in the order named being respectively ½, ⅝, ⅞ and 1 inch, weighing 3½, 6, 12 and 16 ounces each. In this connection the company issue illustrated descriptive slips, envelope size, with the imprint of the dealer on, to those who request them.

The Ætna Hot Corn on Cob Holder.

The Ætna Hardware Company, Unionville, Conn., are putting on the market the holder for hot corn on the cob, as illustrated herewith. It is designed to obviate the necessity of handling hot green corn with the fingers, while eating. It is pointed out that the holder prevents burning the fingers and eliminates other disagreeable features when eating corn from the cob. The holders are made in two grades.



The Ætna Hot Corn on Cob Holder.

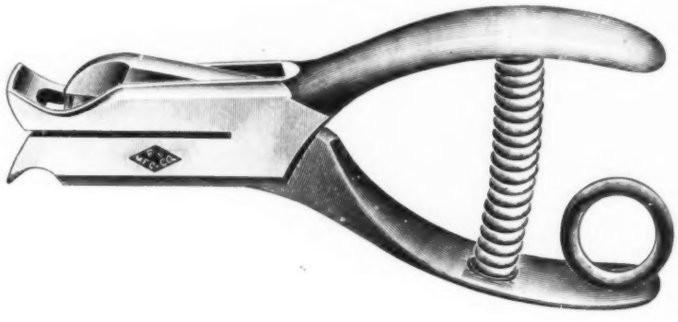
The Ohio Steam Cooker.

The accompanying cut represents a steam cooker put on the market by the Ohio Steam Cooker Company, Toledo, Ohio. The cooker is provided with a copper tank, a condenser and a tube to carry the waste steam back into the water tank at the base; also a gauge indicating when the cooker needs more water. Features of the cooker are its square shape, doors and removable shelves. The doors obviate the necessity of letting down everything to be cooked from the top, as is the case with a round cooker, and of lifting out different dishes to get at the desired article. It is explained that meat, pudding and vegetables may be cooked at the same time without emitting any unpleasant odors or mingling the flavors. The cooker is also recommended for canning fruit and other articles that are usually boiled in water or cooked in an oven. Among other points of excellence the manufacturers enumerate the following: That steam cooked food is more palatable and easier digested than food that is roasted, boiled or baked; that by the use of the cooker provisions, fuel and labor are saved; that when meals are delayed the food may be kept warm and not be spoiled by leaving it in the cooker, and that an entire meal can be prepared over a small gas or oil burner. The cookers are made in different sizes, with one and two doors and three or four shelves. A cook book accompanies each cooker, containing receipts that can be used in preparing different foods in the cooker.

The Ohio Steam Cooker.

Railroader Ticket Punch

P. Lowentraut Mfg. Company, Newark, N. J., for whom John H. Graham & Co., 113 Chambers street, New York, are sales agents, have just put on the market a fine new ticket punch, called the Railroader, as here illustrated. It is designed particularly for railroad men, and is especially well made. The punch is numbered 290, and followed by the letters J, K, L or M indicate some of the different cutting dies or designs. It is 5½ inches long over all, weighs 7½ ounces, and is finely polished and nickeled. The length of the center slot will permit of punching 1½ inches from the edge. The extra large space around the cutting die enables the user to see correctly just where he is punching, so as to accurately punch out dates or other symbols without loss of time. The ring can be used in connection with the little finger or carry a chain to be attached to a uniform coat. The company have dies for about 475 different designs, all of which are shown in a booklet just published. In ordering the general number of the punch together with the number of the design identifies the goods, but in addition they have several special designs as follows: For instance, No. 290 K indicates the cutting letters B. C. (baggage check); 290 L, 2 D (second class), and 290 M, 1—2 (half fare). Each punch is put up in a neat paper box.



Railroader Ticket Punch.